Revitalizing Urban Areas: Nature Enveloping the City

Reid M. Arakawa
May 2010

Submitted towards the fulfillment of the requirements for the Doctor of Architecture Degree.

School of Architecture
University of Hawai‘i

Doctorate Project Committee
Clark E. Llewellyn, Chairperson
Don E. Carlson
Kevin Y. Nishikawa

Revitalizing Urban Areas: Nature Enveloping the City

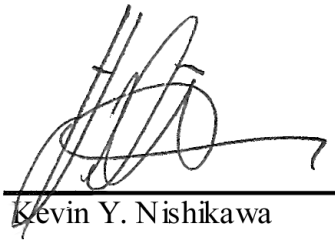
Reid M. Arakawa
May 2010

We certify that we have read this Doctorate Project and that, in our opinion, it is satisfactory in scope and quality in fulfillment as a Doctorate Project for the degree of Doctor of Architecture in the School of Architecture, University of Hawai'i at Mānoa.

Doctorate Project Committee

Clark E. Llewellyn, Chairperson

Don E. Carlson



Kevin Y. Nishikawa

Table of Contents

Abstract

This study provides insight on America's development history from the late 1800's to the present day and presents the problem that America currently faces as a result. This problem is the lack of cohesion in our urban communities, such as buildings that fail to relate to each other, weak and dangerous pedestrian connections, and the deficiency of parks, open spaces and nature. Providing interesting public spaces, which are filled with nature, along with integrated mixed-use developments can strengthen our communities. Solutions are explored through case studies, with a focus on installing vegetation and creating parks in urban areas.

The intent of this D. Arch project is to take an existing site in Oahu's urban area and install nature in this urban space.

The research strategies utilized are:

- **Interpretive Historical Research**

  The research will describe America's development history and identify what events and decisions led to our current way of living.

- **Qualitative**

  Contemporary issues such as new urbanism and smart growth will be explored as well as studies of the benefits plants bring to our lives.

- **Case Study Research**

  This research will include studies of contemporary examples of buildings that enhance communities with nature that add new ideas to the final design.

- **Design Based Research**

  The design section will use the knowledge gained from the above sections to create a project effectively incorporating nature into the design.

Background/Field of Study

Hawaii's natural landscapes are a breathtaking sight. Our urban landscape, however, are a stark contrast. There are buildings that do not relate to each other and streets that are not pedestrian friendly. The result is a weak sense of community. Where is our sense of place?

Urban design is concerned with much more than just the functional aspects of the building itself; it also involves such things as the arrangement and design of buildings, public spaces, transportation systems, and amenities. A building affects more than just the foundation it sits on; pedestrian safety, pedestrian connections, traffic, community needs, public parks, and surrounding districts are just some of the factors that need to be considered. Urban design combines architecture, landscape architecture, and city planning to form beautiful and functional spaces.[1]

Modern development patterns in America require people to drive everywhere in order to survive. People today must drive to go to work, to go shopping, and even to work out a fitness gym! Having a convenience store five minutes away from one's home is something that is almost non-existent today. Andrés Duany describes the faults of America's modern development patterns in his book entitled "Suburban Nation." This book is particularly illuminating to the way people live their daily lives. The current development patterns of America are unsustainable, and this book made me realize that a big change needs to occur to remedy our unsustainable way of life.

Poorly designed suburban developments have no unique cultural identity. Oftentimes, developers use the same layout and design in two materially different locations without accounting for the unique characteristics of the localities. Granted, not all suburban developments exhibit this lack of

[1] (The Center for Design Excellence n.d.)

planning; however, the majority have had devastating effects on our lives and the environment.

The American Dream

America is a relatively young country composed largely of those who are descended from within a few generations of immigrants. Many of those who came to America came looking for a new life—a better life. America became known as the land of opportunity where people could be anything they wanted regardless of age, race, religion, or class. Individuals have their own unique aspirations and dreams, but the main theme of the so-called "American Dream" is being able to attain it with hard work. Many Americans believe that the American dream involves merely one's own wealth and prosperity. Americans have come to equate owning a car and a house in the suburbs as the epitome of success, and this ideal has been promoted by America throughout its history.

Americans have long held on to the belief that individualistic effort is what makes dreams possible. Oftentimes in American tales, the role of the hero is emphasized rather than the group effort that supported it. For instance, Paul Revere's alarm was successful only because of the networks of civic engagement within the village.[3] Even today, groups are known, but the individual is still emphasized. Individual accomplishment has become an inseparable part of the American psyche.

Another American ideal is the concept of the nuclear family, which over the years, has slowly eroded, and family togetherness has become less common in contemporary American lifestyles. Americans that said they ate dinner together has declined from 50 percent to 34 percent in the past 20 years. According to roper polls conducted between 1976 and 1997 of families with children aged 8 to 17 years old, the instances of:

- vacationing together declined from 53 percent to 38 percent;

[3] (Putnam 2000, 24)

- watching television together declined from 54 percent to 41 percent;
- attending religious services together declined from 38 percent to 31 percent; and
- "sitting and talking" declined from 53 percent to 43 percent. [4]

The social ties and interactions within our communities are slowly diminishing over time. A Department of Justice's survey of twelve cities nationwide found that 11 percent of all residents attended a neighborhood watch meeting, which is a group that helps protect the neighborhood from crime. When compared to 14 percent who kept a weapon at home, 15 percent who have a guard dog, and 41 percent with extra locks installed, the statistics show that people are much more concerned with their own individual safety than the safety of the neighborhood. [5] More and more Americans do not even know their neighbor's name, and not knowing our neighbors translates into not trusting them. The routine of the average person is to go to work, come home, and watch television. The life of the average American is highly exclusive.

Our grandparents and parents speak of very close bonds with neighbors. They reminisce about how they knew everyone on their block. Most people today hardly know their neighbors. Our communities are no longer communities in the true sense of the word. We live in housing developments among strangers. Our way of living is the most important factor of our changing lifestyles. There needs to be a change in our thinking and designing. Moreover, there needs to be a change in the American Dream.

Problems with Suburban Sprawl

The word "suburb" was first used in 14-century England to refer to a hamlet outside the walls or boundaries of the city.[6] Today, 70 percent of

[4] (Putnam 2000, 101)
[5] (Putnam 2000, 107)
[6] (Chiras and Wann 2003, 13)

Americans live in the suburbs.[7] A suburb is generally defined as being low density, single use development pattern that is found miles away from the city.

Many people have chosen to live in the suburbs to start a family, be in a safe place, and find an affordable place away from the busy city. Amenities such as big box retailers, gas stations, fast food chains, banks, and regional shopping malls have moved out to greet the suburban dwellers in an effort to make things more convenient. Our cars have made it possible for us to go to all of these places, which are typically more than a "short walk" down the street.

While there are many perceived benefits of living in the suburbs, there have been also been some serious negative effects of the suburbs as well. Not all suburban developments have a lack of planning, but the majority of them are poorly planned and this has had a devastating effect on our lives and the environment.

There are seven main problems with suburban sprawl: it consumes huge amounts of land; it causes increased transportation time; it lacks a sense of community; it creates confusing layouts; and it encourages segregation, privacy, and age uniformity.

- **Consumes huge amounts of land**

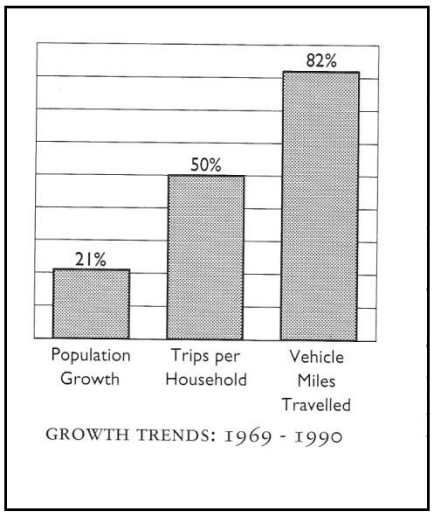
The first suburban developments were located directly outside the city. However, as undeveloped land outside the city became scarce, the suburban sprawl extended its reach to newer developments farther away from the cities. Single family homes and workplaces continue to be separated by extremely far distances.

- **The traffic problem and gridlock**

Between 1969 and 1990, the national population grew by 21 percent while the total vehicle miles traveled in cars increased 82 percent.[8] The increase

[7] (Morris 2005, 16)
[8] (Calthorpe 1993, 27)

in the number of vehicles has also increased commute times. Many suburbs are connected by feeder roads that all eventually connect to an arterial road, which is a format that leads to congestion. The more suburbs there are in the area, the more traffic there will be.



(Calthorpe, 47)

- **An uninteresting streetscape and a lack of nearby necessities.**

One reason families move to the suburbs is because it will likely be a safer place to raise a family. While this may be true in certain respects, the child will be raised in an environment that is boring and unchallenging. The child's mobility is severely limited in the suburbs. For example, stores, parks, schools and friends may all be out of walking distance. Oftentimes, the result is a child that is glued to the front of a television or a computer screen. Without transportation, children become dependent upon their parents until they can have a car of their own, which adds more cars per household. The elderly are affected by this choice as well, since a lot of elderly are not fit to drive, but do so regardless out of necessity.

- **Roads are confusing and do not connect to other communities.**

Suburbs generally do not connect to each other. Roads usually lead back to the main arterial road that they came in from. A leading national real estate

developer estimated that 8 out of every 10 new suburban projects are gated.[9] Gated communities do not link to other places; they cut themselves off from everything else for the sake of their safety and privacy. The roads are often confusing and disorienting because they are curved and the houses look identical. Many people associate driving in the suburbs with getting lost because of its uniformity that looks seemingly endlessness.

http://readingcities.com/images/uploads/suburbia1_thumb.jpg

- **Separating uses separates people**

The idea of separating different housing developments according to use, age, education, and income is something that has separated us as people. Placing low income housing units together has been proven to have negative effects. The developments turn potential communities into slums. Robert J. Simpson, a criminologist, concluded that communities characterized with little networks among residents, unsupervised teenage groups, and a weak social participation in local activities face a higher risk of crime and violence.[10] People who are surrounded by other low income people often are influenced by their peers and end up falling into the same negative habits. People who live in separated income developments have a preconceived conception regarding their "correct" place in society. Because there are social classes, there are often some levels of animosity between groups. Many people do not interact with other

[9] (Duany, Plater-Zyberk and Speck 2000, 45)
[10] (Putnam 2000, 308)

classes and are often misunderstood. The walls of separation need to be broken down and we all need to realize that we are not so very different from each other. Placing elderly to live together sounds like a good idea at first, but it also cuts them off from other age groups and only serves to make them feel even more helpless, lonely, and older.

- **Enforcing privacy over social life**

Privacy is something everybody needs, but too much privacy does have its negative effects. Environmental psychologists have found that people who are integrated into a local community network report fewer symptoms of psychological disturbances than individuals who are socially isolated.[11] The correlation is that people who are involved with their community and interact with people are more likely to be happy and mentally stable. Strong social networks are found in the suburban setting today, but our social networks are not as strong as they used to be. The design of a suburban house emphasizes privacy. Suburban houses are setback 20 feet from the street, discouraging comfortable talking distance to the sidewalk. Garages take up the majority of the house façade in most cases, and social spaces are found in back of the house. This emphasis on privacy causes a decline in social interaction within the community.

- **Does not allow for change**

Suburban developments are filled with curved roads and are zoned for residential use only. The area is impossible to build anything but single family homes because the land is oddly shaped by cul-de-sacs. When populations grow and people want new things, the suburbs are unable to change. Cities that have blocks can change uses and densities as needed. Suburban developments are unable to be retrofitted for our ever changing future.

[11] (Morris 2005, 49)

- **Age Uniformity**

Before a new housing development begins all the houses are typically sold off to young couples and families. Because of this, the entire development grows old together. This poses a problem for schools, because there is a need for schools in the beginning. However, there is a drop in children after a certain time because there are no longer children in the suburban development. For example, Pearl City on Oahu is a suburban area. Today it is now an old suburban development that once had many children, but today has very few children. "We don't have candy ready for Halloween because there are no children that come around anymore." says Alison Kato, a Pearl City Resident.[12] The schools suffer from the lack of children, because enrollment is down and continues to drop. The department of education solves this problem by extending the community boundaries so that more people can attend the Pearl City schools. Housing developments go through these common, cycles and Pearl City is one that is currently in flux. New families are taking over the old neighborhood as the elderly pass away, give the house to their children, or move.

Despite these drawbacks, there are still some good qualities and perks to living in the suburbs. Although I stress suburban developments being all the same, some developments are better than others. People that live in the suburbs are aware of its critique, but they still choose to live there. People do not think they are making a big mistake by living in a big house with a yard--at least not initially. However, we have been fooled into believing that the suburbs are the ultimate and best choice of living.

A car is a convenience when going to go to the store, to school, to work, to the park, to visit friends, and even to a fitness center. Our lifestyle has become so decentralized that it requires us to drive most of the time. The car makes traveling over far distances possible, but at the same time it has

[12] (Kato 2008)

segregated our lives. Why can these things not become possible without traveling long distances? The suburb has necessitated the need of each person to own a car.

Unsustainable Suburbs

Suburban sprawl has been blamed for increasing traffic, air pollution, segregating neighborhoods, and taking up more and more of America's green space. The physical and psychological effects of sprawl also have an economic affect. According to the Sierra Club, taxpayers subsidize sprawl by:

- building new, wider roads;
- building schools on the periphery;
- extending sewer and water lines to new developments;
- extending emergency services to new developments; and
- directing pay-outs to developers[13]

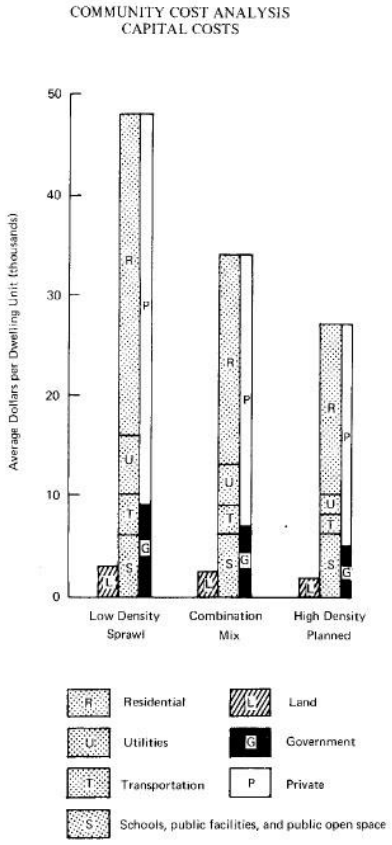
A study conducted by the Real Estate Research Corporation for the Department of Housing and Urban Development and Environmental Protection Agency, concluded that building at lower densities results in a higher economic cost, environmental cost, natural resource consumption, and personal costs.[14] The study focused on three community types:

- Low density development: The whole community is single family homes
- Combination development mix: The community has 20 percent of five types of dwellings with half in a planned unit development and half in subdivisions.

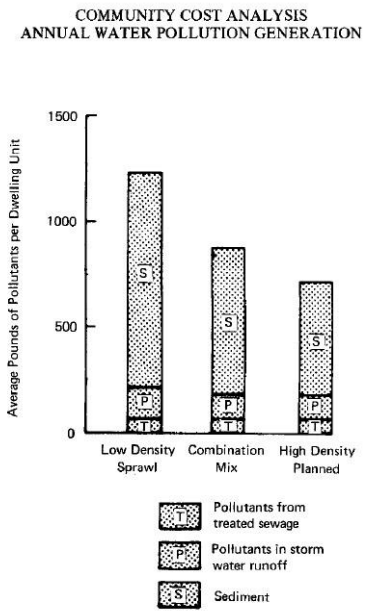
[13] (Cain 2000)
[14] (Corporation 1974, 6)

- High density planned development: The community is made up of 40 percent high rise, 30 percent walkup apartments, 20 percent townhouses, and 10 percent clustered single family homes.

Total investment costs for high density planned communities are 21 percent below combination mix and 44 percent below low density development. Surprisingly, results have shown that higher densities are the better way to go. However, the opposite seems to be happening in America's ongoing development patterns that favor low density.



(Corporation 1974, 3)

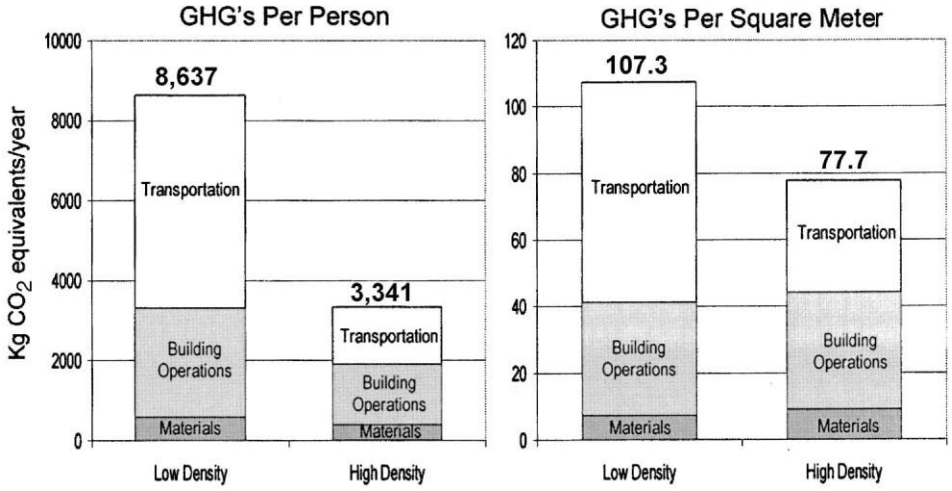


(Corporation 1974, 5)

A study published in The Journal of Urban Planning and Development compared emissions released from building materials and construction, power demands, and transportation energy in suburban neighborhoods and urban areas in Toronto.[15] The study pointed out that downtown residents used drastically less energy than their suburban counterparts.

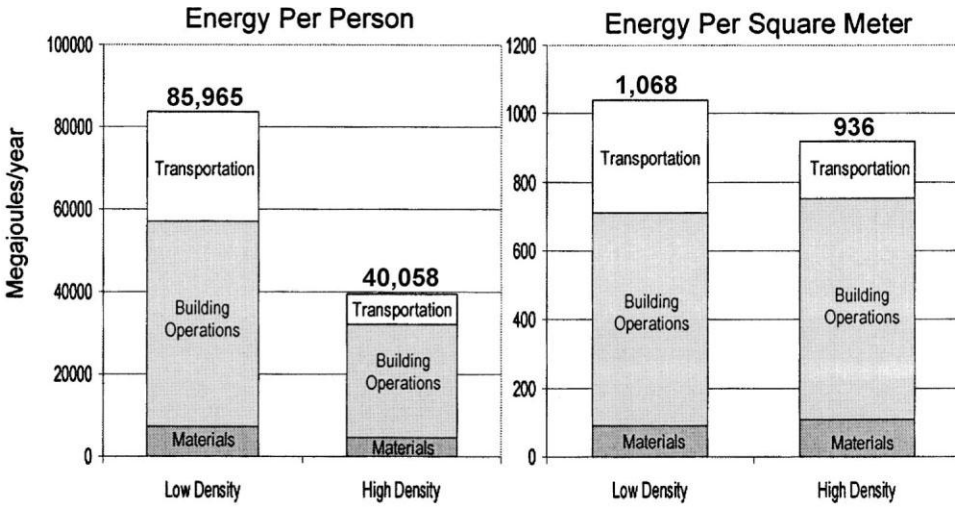
The biggest difference between the city and suburban areas are the transportation emissions. Suburban dwellers used 3.7 times more transportation energy than their urban counterparts. Mass transportation has higher emissions in suburbs than in the city because destinations are spaced far apart.

[15] (Norman, MacLean and Kennedy 2006)



(Norman, MacLean and Kennedy 2006, 18)

The energy consumption of single-family houses is higher than that of high density units. Embodied energy and GHG emissions coming from material production are 1.5 times higher for the low-density units than high density units on a per capita basis. On a per capita basis a low density development in Canada used 1.8 times more energy for building operation in 1997 than a high density apartment. Other studies have pointed out similar findings saying that single-family houses use twice as much energy as high density units.



(Norman, MacLean and Kennedy 2006, 18)

Combining the material production, building operations and transportation results in the graph above. The low density units use 2.5 times the annual green house gas emissions on a per capita basis compared to the high density units. The low density units use twice the amount of energy per capita than high density units.

Background Conclusion

The suburban paradigm has revealed itself as a destructive development pattern. The sprawling development pattern has disaggregated uses and has caused devastating effects on us physically, socially, and negatively affects the environment. There needs to be another way of planning our future and living our lives because the suburban paradigm is not going to get us very far.

Research Project Statement

I am exploring urban design with an emphasis on parks and plants in order to find out how to strengthen community connections and incorporate vegetation in an urban setting.

Cities have been plagued with negative words such as overcrowded, dirty, and dangerous. The late 1800's image of a city has carried on to the present day even though proper regulations and technologies have changed a great deal since then. Outside the city, the suburb was believed to be a peaceful, safe and a perfect place to live. The images of the city and suburb are in many cases, misleading. There are dirty, unsafe, overcrowded suburban developments and there are safe, clean, desired populations in cities.

Recently sustainability has come to the forefront of architecture and many other professions. Companies have come to advertise and sell sustainable products. Many of these products are aimed for homes like solar water heaters, energy saving light bulbs, low flow shower heads, low voltage refrigerators, etc… People have come to associate a connection with sustainability and suburban living. The problem is suburban living is not sustainable as much as urban living. People are being misled.

Nature and farmland has become synonymous with suburban development since developments are built on undeveloped land. Each parcel has a yard with vegetation helping each resident reconnect with nature, which is an experience lacking in cities. Urban spaces are associated with glass, metal, asphalt, and concrete. The city doesn't conjure up images of nature or sustainability.

My goal is to change the image of our cities. The city needs to incorporate nature and sustainable technologies. Nature and sustainability should be associated with city living because it has been proven to be more sustainable than suburban living. Nature must envelope the city.

Research Documentation

Before I dive into the design solutions to our development problems it is very important to know how we arrived at such problems in the first place. Knowing the past is a very important step in moving forward into the future. American development has been going on well before the 19th century, but I will only briefly cover the events that affected the outcome of our living patterns today.

The City

Around the late 19th century and early 20th century, America's population began to boom as immigrants flocked to New York City. Consequently, New York City rapidly became overcrowded and dirty. Burdened with the heavy influx of immigrants, the city was increasingly unable to accommodate everyone.[15] The City Beautiful Movement was initiated for the purpose of addressing New York's poverty problem. Living conditions of the poor were terrible as people were cramming themselves into small rooms with no ventilation and unsanitary condition. There was little to no social mobility and the poor were forced to use their bedrooms as places of business.

http://en.wikipedia.org/wiki/File:Bandit%27s_Roost_by_Jacob_Riis.jpeg

Figure 1

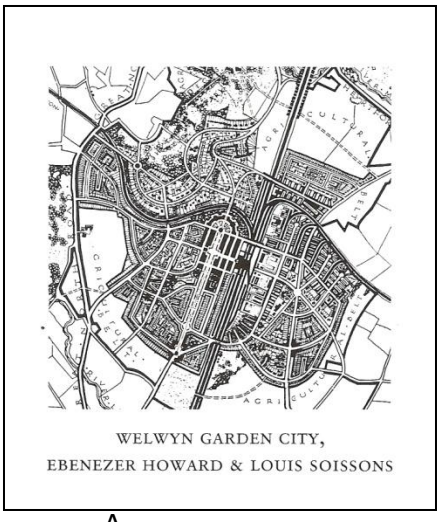
In 1880, Jacob Riis published *How the Other Half Lives*, a publication which features pictures of New York's dark alleys and tenements depicting how the poor lived in the city (Figure 1). This publication persuaded the New York City police commissioner, who at the time was Theodore Roosevelt, to take action.

[15] (Flint 2006, 28)

Thus, the Standard State Zoning Enabling Act was made to provide for the separation of uses and densities. Cities were full of immigrants and carried the stigma of being an unhealthy place. The wealthier classes, consisting of White Anglo-Saxon Protestants, often escaped the dirty, overcrowded city by moving to the suburbs, which was the perfect getaway for them.

The Suburbs

Many people have proposed solutions to serve as an alternative to the city. For example, Ebenezer Howard introduced the garden city. His idea was to have the benefits of both town and country (Figure 3). Ebenezer believed the city was dirty and people should live far away from it in self-supporting towns. A greenbelt would separate the city from the new town and served to protect the countryside (Figure 2). This idea has been the largest influence in today's modern suburban development.



A **Figure 2** (Calthorpe, 13)

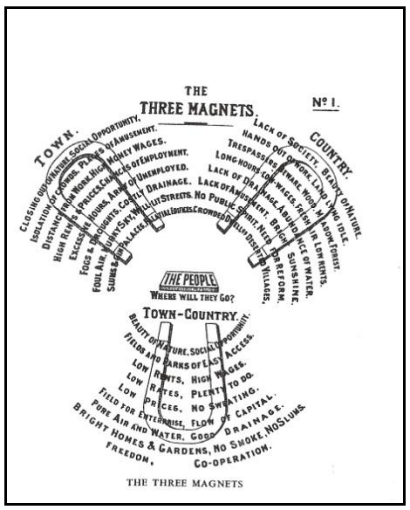
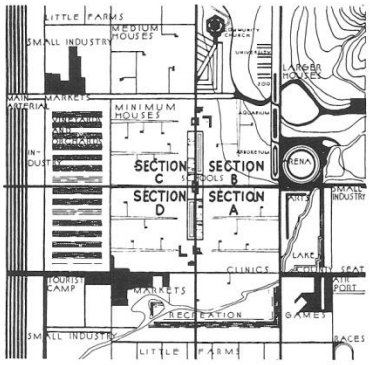


Figure 3 (Duany, 46)

nother critic of the city Tony Garner proposed a modernistic town plan. His vision, "An Industrial City," was published in 1917.[16] His idea was to segregate

[16] (Calthorpe 1993, 33)

industry by dividing the city into four parts: work, housing, health, and leisure. Garnier also freed buildings from the street by proposing to move it farther back.



BROADACRE CITY,
FRANK LLOYD WRIGHT

Figure 4 (Calthorpe, 33)

Frank Lloyd Wright expanded on Garnier's idea, while keeping segregation of uses, the priority of the automobile, and favoring private spaces. Believing the automobile to be the future, Wright imagined an auto utopia where every American had an acre of land. (Figure 4).[17] Wright's sprawling vision of a car oriented future later became a reality.

In the 1939 World's Fair, General Motors sponsored a futuristic idea regarding transportation with networks of high speed roadways connecting to suburbs (Figure 5). The exhibit was featured in the futurama section, which attempted to show the world in 20 years. Freeways were introduced to the public, showing how the roads can reach speeds of 50, 70, and 100 mph and how onramps worked. The new roadway stressed "safety with increased speed." The future roadways allowed a small town to be closely connected with other places more than ever before. People could live farther away from the city and still have a close connection to their workplaces with the use of freeways. Today however, this idea is so widespread that a close connection between home and work is not possible. These models served as a guide after World War II for development patterns.

[17] (Calthorpe 1993, 33)

http://www.good.is/post/the-transport-of-future-past/

Figure 5

The Push for Suburban Living

During World War II, women entered the work force, taking on the former duties of men. When the war was over, the women were demoted or asked to leave in order to accommodate the returning soldiers. The women were basically forced into housewifery. This mindset was imbedded through multiple publications, television shows, and movies advising that women needed to be married and must care for their family instead of work. An article in *Esquire* during 1954 called working wives a "menace," and a *Life* author stated that a married women's employment was a "disease."[18] Television shows like *Leave it to Beaver* were set in middle class, suburban neighborhoods and the characters exemplified the suburban family. The 1946 Academy Award winning film, *The Best Years of Our Lives,* mirrored the current experiences of thousands of returning veterans and what role a wife takes on in making sure her husband gets readjusted into society.

[18] (Coontz 1992, 32)

Every man and woman was starting a family. In fact, being single put both men and women at a huge disadvantage. Bachelors were deemed as "deviants," which could mean a loss of a job or a promotion. Single women were called "perverted" or "neurotic". All women were frequently denied to serve on juries, make contracts, take out credit cards in their own name, or establish residence.[19] A woman needed a man and the only option was marriage. Newly married couples and families had to find a house they could call their own.

Due to all the returning veterans, the government funded thousands of housing developments all over America. The suburban developments were expanding farther away from cities because of the inordinate amount of land they consumed. American military families could easily obtain affordable mortgages to on the purchase of houses and many veterans went back to school through the GI bill. The American family was booming and it became known as the baby boomer generation (1946-1954). Families were buying up televisions, appliances, and cars in great numbers.

Traffic solutions also led to the encouragement of suburban living. As increasing numbers of people began living far away from the city, traffic soon became a problem that everybody faced. People were stuck in traffic for long periods of time. In response to this problem, Dwight Eisenhower developed a transportation system that could link military bases. Eisenhower envisioned a system that allowed faster, effective transportation of troops in case of an attack and that would relieve traffic congestion. So in 1956, the Federal-Aid Highway Act was created, which at the time was the largest public works project. The Act created a 41,000 mile network of roads linking 90 percent of all cities with populations greater than 50,000 people. The Federal Government issued $25,000,000,000 among the states over thirteen years to pay 90 percent of the

[19] (Coontz 1992, 32)

total construction costs.[20] This Act created new freeways that also encouraged people to live farther and farther away.

Having gone from working and interacting with co-workers during the war to staying at home, the suburban housewife found herself with an excess of free time. A San Francisco Bay Area study concluded that institutionalization and sometimes electric shock treatments were used to force women into domestic roles and listen to their husband's requests.[21] The suburban lifestyle with its lack of activities did not provide the same opportunities found in cities, such as the ability to interact with large numbers of people. There was no reason to walk outside unless it is for exercise, because everything else was out of walking distance. The main activity in the suburbs that allowed for interaction was the mall. The mall became the gathering place for housewives and the mall catered to their needs. Malls often included dry cleaners, supermarkets, salons, men and women's clothes, and a variety of other things that made it a one stop shopping place that they could spend all day at.

The Mall

Victor Gruen wrote in a Harvard article that since people were living away from the city, there should be shops placed closer to where they live. His idea caught on. Dayton owners contacted Victor for a new mall incorporating his innovative idea. Retail malls at the time always faced an open courtyard, but Gruen proposed to Dayton owners that he wanted an enclosed mall that is climate controlled because an outside mall in Minnesota would affect sales. He believed people who were comfortable would shop longer. He designed the Southdale mall in 1956, which was the first two story, fully enclosed, climate controlled shopping center (Figure 6). The mall was the biggest mall at that time with 1,000,000 square feet of retail.[22] Dayton served as one of the department

[20] (Weingroff 1956)
[21] (Coontz 1992, 32)
[22] (Coleman 2006, 43)

store anchors. The ground floor would have the best location for customer traffic compared to shops on the second floor, but Gruen graded the parking lot so half of the people would enter the second story and the other half would enter the bottom.

http://images.publicradio.org/content/2006/10/05/20061005_birdeye_2.jpg

Figure 6

Victor Gruen's idea spread like wildfire. The idea of air conditioned stores caught on with retailers, but it also led to fewer windows in order to reduce cooling costs. Air conditioning is the reason why malls became a blank box enclosure.

Gruen wanted the shopping center to be a community center instead of just part of the centerless suburban sprawl. Below are the second "out-of-town" type examples of retail John Graham, Morris Ketchum, and Victor Gruen created. From 1945 there were 45 malls in America. In 1958, just 13 years later the total amount of malls equaled 2,900.[23]

Rotting Downtown

New developments sprung up and more and more greenfields were destroyed for housing developments, office parks, and shopping malls. America's development pattern was sprawling outwards without limits. Buildings were set back, signs were made bigger so it could be read at high speeds, huge parking lots fronting the stores to be welcoming (to cars), and fast food restaurants boomed with their ever popular "drive-thru." Living farther distances meant longer commutes and when everybody else was doing the same

[23] (Coleman 2006, 42)

thing then it only leads to gridlock. The beginning of the 1970's for the first time ever, more Americans lived in the suburbs than any other location.[24]

The American way of life was greatly altered. As more and more people began moving out and away from the city, the city retailers have been dying out. Buildings in downtowns all over the United States were in serious decline in the 1960s and 70s due to drastic changes in development and trends.[25]

A speech delivered by Eero Saarinen with Victor Gruen before the Economic Club of Detriot on November 12, 1956, Eero said, *"Within the next thirty years, architecture will be concerned with answering the needs and the social problems created by the automobile. The redevelopment of the rotting central cities and the establishment of decentralized cultural nuclei, are such problems."*[26] Eero Saarinen was indeed correct about his prediction and architecture has been deeply connected with the automobile. Many people have increasingly shown concern over America's obsession with suburban living and started to propose a paradigm shift.

Michael Beyard, a senior resident fellow and retail expert with the Urban Land Institute (ULI) in Washington, D.C. Beyard goes on to talk about shopping centers built in the boom years in 1970 to 1980's which he calls "monocultures." He states that one activity, one organism has risks just like monocultures in biology. "It's like if you plant one crop over and over, you deplete the soil. If you have 10 crops, you constantly replenish the soil." Examples in nature point out similar problems with our man-made development problems. The lack of diversity makes retail properties more vulnerable to die out.[27] Diversifying a retail-only plot of land lowers the market risk. The plot of land does not rely only on the retail market, but it can produce gains in office spaces or residential units.

[24] (Coontz 1992, 88)
[25] (Main Street National Trust for Historical Preservation 2000, 1)
[26](Serraino 2006)
[27] (Valley 2002)

In biology a polycultre is a mix of different plants growing together in the same soil and is just like mixed-use developments. Polycultures benefit from sharing the same soil by being less susceptible to diseases and insects and as Beyard points out, it also replenishes the soil. Suburban retail struggles to stay the same, but it has been hit with reality that remaining the same will kill it. So like everything in life, it must adapt or fail to continue. Valley, Matt. "The Remalling of

Developing Smart

Identifying the problems with sprawl is important, but what's more important is solving the problem. The topic of sprawl led me to New Urbanism and Smart Growth planning concepts. Compact living, diverse housing, walkable, transit served, and mixed-use community are a summary of what Smart Growth and New Urbanism is. These new sustainable planning practices are the opposite of sprawl and serve to fix the problems that suburban sprawl started. Suburban sprawl generally grew horizontally out from cities. The 1st generation suburbs were not too far from the urban center. These places are up for redevelopment. Populations grow from people living longer and continuing birthrates. The city must grow to accommodate this. In time the city will eventually move outward to the 1st generation suburbs. As time goes by the suburban development will redevelop and turn more urban. A house will be turned into a low rise apartment complex.

The U.S. Green Building Council has begun a LEED Neighborhood Development pilot program, which involves 238 projects in 39 states. Points can be given for LEED according to:

- Location and linkage
- Neighborhood pattern and design
- Green construction and technology

- Innovation and design process[28]

The U.S. Green Building Council worked in partnership with the Congress for the New Urbanism and Natural Resources Defense Fund. A lot of new forms for development have popped up recently like Smart Growth, Transit-Oriented Development, and New Urbanism. There isn't a need to find a difference in them, because they all aim for a dense, walkable neighborhood that provides a mix of housing types, transportations options, and mixed-use that can strengthen a community. New Urbanism takes ideas from traditional town planning. Architecturally, new urbanism projects have a mix of styles from traditional houses to new, modern designs. "These communities are, first and foremost, places that people want to live," says Meghan Bogarts in an article in Innovative Homes Magazine.[29]

Image by: Alec Johnson featured in Innovative Home Magazine, Winter 2007

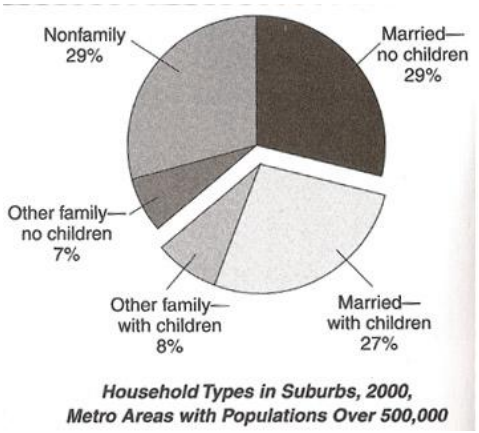
Smart Growth, New Urbanism, and Transit-oriented development all strive for the following:

[28] (Bogaerts 2007, 79)
[29] (Bogaerts 2007, 76)

Provide for Everyone (Mixed-Use)

Every person has different wants and needs, but suburban development has been unable to cater to the needs of the majority. A diverse housing development can provide choices that were unavailable to suburban dwellers. Suburban developments have catered to different income groups, but have never truly accommodated all groups.

The suburbs were originally designed for people who could afford to live outside the city and for the last fifty years have been associated with middle class white America. A housewife, a working husband, and two kids seemed to be the norm, but that is no longer true. Suburban developments are single-family homes, but now most people that live there do not have kids. A study by the US census bureau in 2000 found that the majority of households did not have children in them and the trend is expected to increase in the future.[30] The American lifestyle has changed, but our development patterns and architecture have not. There are many singles, couples without kids, and others who live in the suburbs, which are typically designed for a family (figure 7). People need a variety of choices rather than trying to fit into a place that was not designed for them.

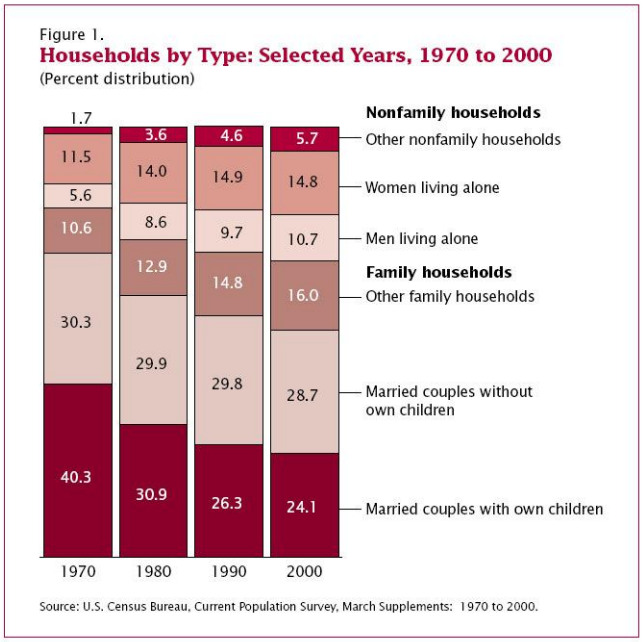


Source: 2000 US Census (Williams, 18)

Figure 7

[30] (Dunham-Jones and Williamson 2009, 18)

The graph shows the total U.S. population grouped by type from 1970 to 2000 (figure 8). The graph shows the clear decline of the American family. In 1970 married couples with children were 40.3 percent of the population, but today it is down to 24.1 percent.



Source: 2000 US Census

Figure 8

The new generations are growing up differently than older generations. Marketers stress that newer generations want different things such as 77% plan to live in an urban core and 70% do not think they will move to the suburbs when they have kids. They state the convenience of healthy, walkable, mixed-use communities.[31]

Retail also shows a need to diversify. "Just because something was retail doesn't mean it should always be exclusively retail" says Michael Beyard, a senior resident fellow and retail expert with the Urban Land Institute (ULI) in Washington, D.C. Beyard goes on to talk about shopping centers built in the boom years in 1970 to 1980's which he calls 'monocultures.' He states that one

[31] (Shoup 2005)

activity, one organism has risks just like monocultures in biology. "It's like if you plant one crop over and over, you deplete the soil. If you have 10 crops, you constantly replenish the soil." Examples in nature point out similar problems with our man-made development problems. The lack of diversity makes retail properties more vulnerable to die out.[32] Diversifying a retail-only plot of land lowers the market risk. The plot of land does not rely only on the retail market, but it can produce gains in office spaces or residential units. In biology a polyculture is a mix of different plants growing together in the same soil and is just like mixed-use developments. Polycultures benefit from sharing the same soil by being less susceptible to diseases and insects and as Beyard points out, it also replenishes the soil. Suburban retail struggles to stay the same, but it has been hit with reality that remaining the same will kill it. So like everything in life, it must adapt or fail to continue.

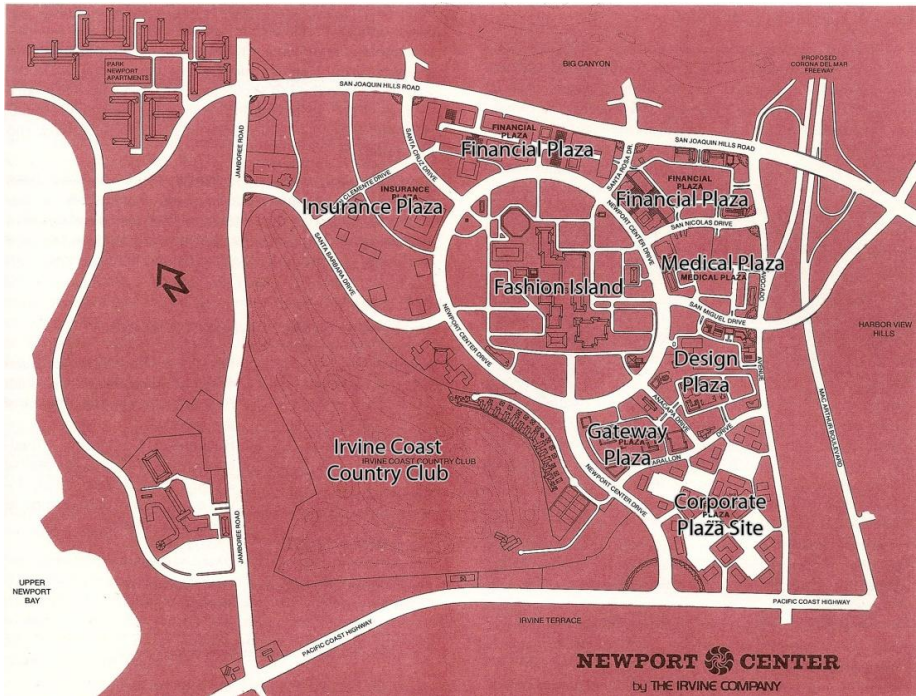
Mixed-use development is a usually large-scale project with three or more revenue-producing uses such as residential, retail, entertainment, hotel, offices, and recreation. The uses should be mutually supporting and have pedestrian traffic connections.[33] Having three or more significant uses means multiple trips can be taken care of in basically the same area. The site becomes a place people want to go to. The three of more uses can mutually support each other, extend operational business hours, and cater to a broad range of people.

Mixed-use is not a new concept by any means. However, mixed-use has been rare to find for most of the 20th century since zoning laws restricted mixing uses. Land uses are separated and suburban living only helped support it. Shopping in one area, office in another area, and housing in one area has forced people to drive every place for their everyday needs.

[32] (Valley 2002)
[33] (Witherspoon, Abbett and Gladstone 1976, 6)

Surprisingly the suburban mall was the building type that helped bring mixed-use into the public light once again. Suburban shopping malls began adding additional uses during the 1960s. Free standing fast-food restaurants, offices, medical buildings, and other uses would be added around the malls periphery. However, these additions weren't planned and were often afterthoughts, but these malls began to turn into highly popular places and developers discovered that people liked a one stop shopping experience.

Newport Center is one of the first attempts to functionally relate the uses together so they can support each other (Figure 9). The site is 622 acres. An oval road surrounds a shopping mall with has four department stores and 60 shops. On the outside of the oval road there are divided blocks which are grouped into categories like design, medical, financial, insurance, hotel, and apartments. The leasing agents believed that lease would sell quicker if offices and residential was separate. The development sold 100% of its leases before opening.



(Witherspoon, 19)

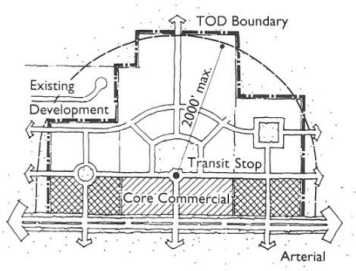
Figure 9

However, as a mixed-use development Newport Center doesn't cut it. The center lacks integration of uses, because everything is so spread out and difficult to get to. Car trips were still required to go shopping and then visit the doctor because the oval six lane road isn't promoting pedestrian life or the large parking lots that surround the main mall. The densities in the development were too low. The project isn't a good example of a mixed-use project, but it serves as a lesson. The designers realized that compact, high density mixed-uses with strong pedestrian connections were vital in creating a successful mixed-use site. The next generation of mixed-use projects would need to be more compact.

Make Transit Work

Compacting housing developments, promoting mixed-use, and building at higher densities will promote a higher ridership. The idea is simple. The more people that live near a station, the more who will likely use it. The main concern for transit a user is convenience. Bus lines and rail lines frequent higher densities for higher ridership. Catching the bus to work from a suburb often results in long waits since bus routes are less frequent.

A transit-oriented development (TOD) starts from the transit stop and radiates out with a radius until about a quarter mile. A quarter mile is a distance, which an average person on foot is willing to walk (5-10 minutes). Transit-oriented development stresses high density living with the densest places being the closest to the stops and gradually declining in density the further away a site is located away from the stop. High density living near transit stops encourages more people to use transit, creates safe and livable streets, and justifies frequent transportation services.



(Calthorpe, 66)

Vehicle miles traveled can be reduced by a mode shift to another transportation system, reductions in trip length, and not going out at all. TOD locates different uses in close proximity to help eliminate trips. The total number and length of trips are reduced. Households in transit zones own an average of 0.9 cars, compared with 1.6 cars for metropolitan regions 54% of residents in a TOD traveled by car compared to 83% to the region as a whole.[34]

Increase our Street Safety and Connectivity

On the surface, streets connect us to places, move people and goods, drain rain water, provide safety for drivers and pedestrians. Streets also house underneath the city's infrastructure. The street houses sewage, water, storm water, electricity, gas, and telecommunication systems. Streets are an important part of a city which is responsible for the travel of so many things that enable a community to function properly.

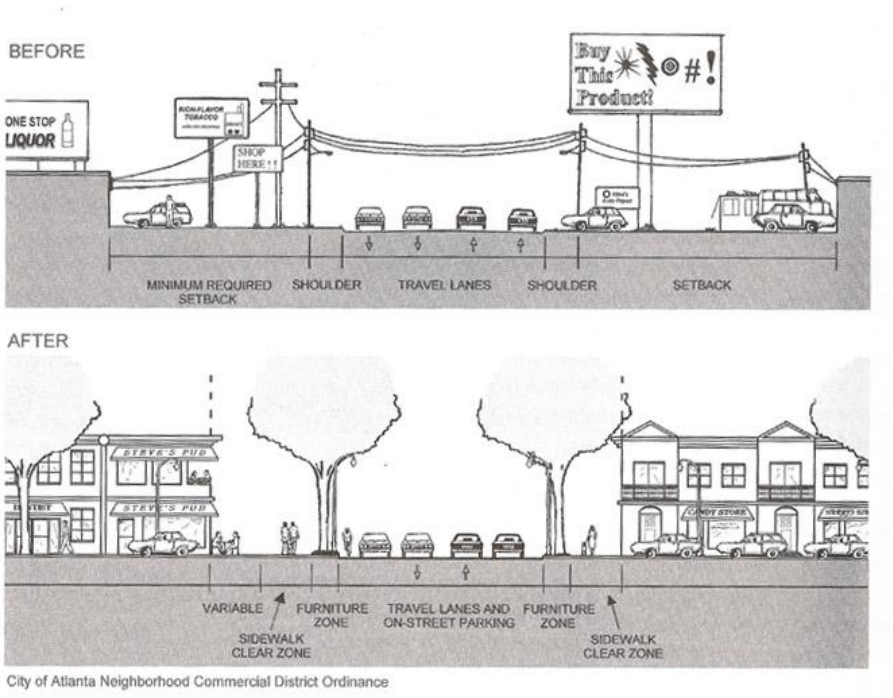
A diverse setting allows for diverse people. Different uses also have different times of operation which enable a spread of people through the day. Mixed-use communities enable a balanced mix of people walking around for different reasons and at different times of the day. Mixed-use development has been created to save the amount of land and provide access to everyone. Businesses and residential units that area faced towards the street are safer streets. Facing the street provides neighborhood safety for all.

[34] (Transportation Riders United, Inc. 2006)

Douglas E. Morris, the author of It's a Sprawl World After All, grew up in a European mixed-use town and recalls his daily experiences, "*I can still remember times when my mom would send me to go pick up food items from one of the small stores lining the main street. Along the way I would exchange greetings with people I knew and smile at those I did not. I'd window-shop at the toy store, mess around with friends I ran into . . . This could not happen in American suburban sprawl."*[35] The recollections that Morris describes are ones that our children should have the opportunity to experience—the experience of growing up in a real close-knit neighborhood. And by a real neighborhood, I am referring to an interesting environment that gives everybody the ability get to where they want to go.

Designing an environment for the pedestrian is very important. Pedestrian's experience things at much different scales and speeds compared to a driver. A pedestrian travels at speeds of 2 to 3 miles per hour. There is no need for huge, tall advertisements or parking lots adjacent to the road in a walkable community. People do not enjoy walking along a blank wall or an open parking lot. Conscious design decisions need to be made for the sidewalk because people are willing to walk farther distances in comfortable walking conditions.

[35] (Morris 2005)



(Dunham-Jones, Ellen and June Williamson, 88)

Street level businesses without setbacks will encourage people to walk the streets for many different reasons. A city setting has many things to do and there are a bunch of people walking around at different times of the day for different reasons. The suburban shopping center was an imitation of a main street. A shopping center is only an imitation, but a mixed-use development integrated with the community is a real street.

A sidewalk should be an appropriate width which relates to the areas usage. If the sidewalk is in a commercial area, then the sidewalk will be typically wide to accommodate the foot traffic. People will not walk in uncomfortable areas even for a short distance. Also public open spaces should be made to encourage public events and mingling to take place.

A busy road next to a sidewalk is not a comfortable walking condition. A buffer for pedestrians should be made to separate the sidewalk from the road. A 3-8 foot buffer should be adequate for a pedestrian buffer zone. A buffer can be street furniture, on street parallel parking, and shrubs, and trees. A buffer zone creates a physical and visual separation from the street.

How Nature Affects Our Behavior

Plants play a very important role in great street design. Trees shade us from the harsh rays of the sun, protect us from strong gusts of wind, provide us with shelter from the rain, clean our air, and beautify the street. Plants are very important if not one of the most important factors to consider in creating a livable community.

Since the beginning of time humans have had close relationships with nature. They ate berries, fruits, and vegetables. Plants were regarded as safe and beneficial. Today we still have the same feelings and connections towards plants.

"Biophilla, if it exists, and I believe it exists, is the innately emotional affiliation of human beings to other organisms."[36] - E.O.Wilson

Edward Wilson, Department of Organismic and Evolutionary Biology at Harvard University coined the term biophilia. He states that our love and hate for living creature's stems from repeated experiences throughout time that manifests itself in our evolving culture.[37] For example a snake has a negative reaction in most people because they harm people and cultures involved stories giving snakes negative meanings and symbolism. Plants on the other hand give us food and shelter so throughout history, so positive stories, worship, and feelings are passed down because of these experiences. So even today plants are seen in a positive light and are highly desired, unlike snakes.

Affecting our Mood

Having a view of a garden or an ocean view is something we all want. Obviously nobody desires a view of a parking lot or worse, a wall. So it comes to no surprise that people with a view of nature are happier and better off than if they didn't have a view of nature.

[36] (Kellert and Wilson 1993, 31)
[37] (Kellert and Wilson 1993, 34)

Marc Berman, a psychologist at the University of Michigan studied cognitive deficits cause by urban walks. The study guided some of his undergraduate students through an arboretum and the other half walked the streets of downtown. Both teams were run through a bunch of psychological tests afterwards. The people who walked through the city were in a worse mood and scored lower in attention and memory.[38] There are also other studies that point out children with attention-deficit disorder have fewer symptoms in natural settings.

In fact there are many other studies showing that a picture of an urban setting increases stress and a picture of nature can cause a person to calm down. The studies may sound silly at first but Berman says that when we see a picture of a busy street we automatically imagine ourselves there.[39] All the stress associated with the city comes to one's mind when looking at a city picture.

"Humans living in landscapes that lack trees or other natural features undergo patterns of social, psychological and physical breakdown that are strikingly similar to those observed in other animals that have been deprived of their natural habitat"[40] Frances Kuo, Director of the Landscape and Human Health Laboratory at the University of Illinois

Humans were once strongly connected to nature, but our urban lifestyles have separated nature from our way of life. Frances Kuo has stated that humans cannot be separated or else side effects may occur.

Frances Kuo came out with a study in 2001 that shows patches of nature can have psychological benefits. Nature affects crime and conflict resolution among residents in public housing facilities in Chicago. People were randomly assigned to typical housing units, but some had grass and trees nearby. Kuo began interviewing residents in Roberts Taylor Homes. Her team compared people living in various apartments ranging from views of grassy courtyards to

[38] (Lehrer 2009)
[39] (Lehrer 2009)
[40] (Yates 2009)

parking lots. The two groups were tested on their attention to surveys that figured out how the people handled major life challenges. The people who lived with a view of the courtyard had improvements in every category. People with no view to nature reported greater number of aggressive and even violent conflicts with their partners or children than the people who had nature within their view.[41]

Job satisfaction is also affected by nature. Dr. Tina Marie Waliczek Cade, Associate Professor of Horticulture in the Department of Agriculture at Texas State University held a study to see offices with windows and views of green spaces, and offices with real plants would increase productivity and happiness. Regular office environments with artificial light and windowless, report dropped job satisfaction and increased levels of stress. Dr. Tina Marie Waliczek Cade surveyed office workers life quality, job satisfaction, and nature of work, supervision, and coworkers. People who had plants in their office or a window view of vegetation felt better about their job and the work that they did. Surprisingly, the study stated that there were no statistical differences among age, ethnicity, salary, education levels, and position among employees who worked in offices with or without plants or window views.[42]

Cleans the Air

Certain plants have been proven to clean the air we breathe indoors and outdoors. Plants produce food through photosynthesis. Plants take in sunlight and carbon dioxide and release oxygen. Plants also take in certain pollutants. A National Aeronautics and Space Administration (NASA) research team tested the effects of 15 house plants. Benzene, formaldehyde, and trichloroethylene are pollutants found in homes and offices. The pollutants are emitted by

[41] (Yates 2009)
[42] (American Society for Horticultural Science 2008)

furnishings, office equipments and building materials. The NASA study found that certain plants can remove as much as 87 percent of indoor pollutants within 24 hours.

Benzene	Inks, oils, paints, plastics, rubber, dyes, detergents, gasoline, pharmaceutical, tobacco smoke, synthetic fibers	English Ivy, Dracaena marginata, Janet Craig, Warneckei, Chrysanthemum, Gerbera Daisy, Peace lily
Formaldehyde	Foam insulation, plywood, pressed-wood products, grocery bags, waxed paper, fire retardants, adhesive binders in floor coverings, cigarette smoke, natural gas	Azalea, Philodendron, Spider plant, Golden Pothos, Bamboo palm, Corn plant, Chrysanthemum, Mother-in-law's tongue
Trichloroethylene	Primarily used in the metal degreasing and dry cleaning industries; also in printing inks, paints, lacquers, varnishes, adhesives	Gerbera Daisy, Chrysanthemum, Peace lily, Warneckei, Dracaena marginata

(Pottorff 2010)

The NASA research proves removal of harmful pollutant in an indoor setting and it also means it removes pollutants outside as well.

Removes Dust

Certain plants can remove harmful air, but plants can also clean the air of dust particles. A study conducted in a small office at Washington State University monitored humidity and particulate matter (dust) in the room for one-week periods. Interior plants reduced the amount of dust in the room by as much as 20%.

Plants raise the humidity of the room, but fears of it making the office too damp is not a problem. The recommended range is 30% to 60% humidity for a comfortable level. The office was at 25% and the plants upped the humidity to 30%.[43]

[43] (Lohr and Pearson-Mims 2003)

Prevents Soil Erosion and Reduces Rainwater Runoff

Plants and trees take nutrients from the soil, but also replenish the soil by releasing other nutrients. The roots of the plants help keep the soil in place and provide gaps in the soil which helps absorb water instead of letting the water runoff elsewhere.

Improves Property Values

Beautiful plants, arrangement, and care can turn a regular yard into a work of art. The Florida Nursery Growers and Landscape Association found that landscaping can increase the resale value of a property by as much as 14%. A properly landscaped house can sell faster than a house without nice planting.[44] An office in downtown could also increase in value and encourage workers to want to work in such a place.

Public Open Space

"*Public space is the stage upon which the drama of communal life unfolds.*"[45] - Stephen Carr

The public spaces in our urban areas are dynamic spaces. They provide a play area, civic involvement, special interests activities, a place to sell goods, and meeting area. An open space doesn't mean a plain flat space with grass. The most interesting spaces are not level and filled with different plants, sculptures, and other installations. Parks become a representation of the community; if there is a thriving park there must be a thriving community.

Public spaces are publicly accessible areas that people go for group or individual activities. They take on many forms such as plazas, malls, and playgrounds. According to Carr, public spaces all contain common things such as

[44] (Plant-Care.com 2009)

[45] (Carr 1992, 3)

walkways, benches, and water; physical and visual elements, paving or lawn, and vegetation.[46] Such places are formed naturally or planned.

Urban open spaces are first and foremost designed for people, just like architecture. Many people arrive and use the parks by walking, jogging, biking, and skating. A trip to a park should be accessible and accommodating to such modes of transportation. The automobile should be on the bottom of the priority list.

Jane Jacobs argues that parks are not automatically anything.[47] Parks can be popular and very unpopular. Parks are not community anchors or real estate stabilizers she states. She argues that a mix of uses with people using the street at different times of the day is something that affects parks and ultimately makes it successful because people will use it at different times for different reasons.

"The more successfully a city mingles everyday diversity of uses and users in its everyday streets, the more successfully, casually (and economically) its people thereby enliven and support well-located parks that can thus give back grace and delight to their neighborhoods instead of vacuity." [48]

Jacobs states four design elements in parks, which are intricacy, centering, sun, and enclosure. Intricacy at eye level is the change in ground levels, trees, and openings leading to focal points. Centering is a common place within the park that is understood as the center. The sun plays an important role and also shade. Enclosures like trees, bushes, and also surrounding buildings can form an outside living room.

[46] (Carr 1992, 50)
[47] (Jacobs 1989, 92)
[48] (Jacobs 1989, 111)

Research Conclusion

The history of America's development was an important thing to look at because it revealed why suburban living was created. The suburban paradigm was a solution to the overcrowding city, a temporary solution. The suburb has become the problem now and the solution for it is compact, mixed-use developments.

Creating walkable environments is a very important aspect of mixed-use communities. Plants play a significant role in creating safe and pleasurable environments. People tend to walk for longer periods of time if the street is comfortable.

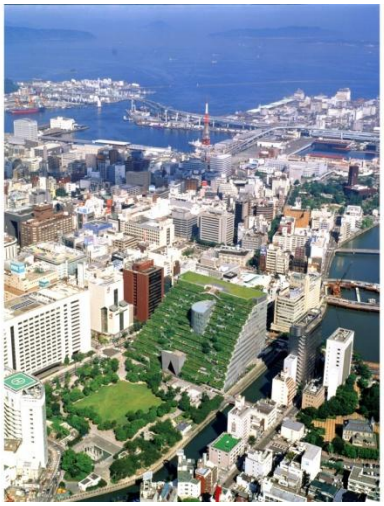
The next portion of this paper will be looking at buildings that allow for people to experience nature all the time. There are many benefits to having plants in our lives. Existing case studies will help to show how other architects approached incorporating nature into their design. Then I will build upon the existing knowledge from the case studies and research to produce a building that will improve the image of the city.

Case Studies

The case studies are examples of redeveloped and new projects that incorporate nature into their buildings. Some are built examples, some in construction, and some that never left the drawing board. However, all examples serve as very interesting examples of nature being fully apart of architecture and not just an afterthought.

Fukuoka Prefectural International Hall

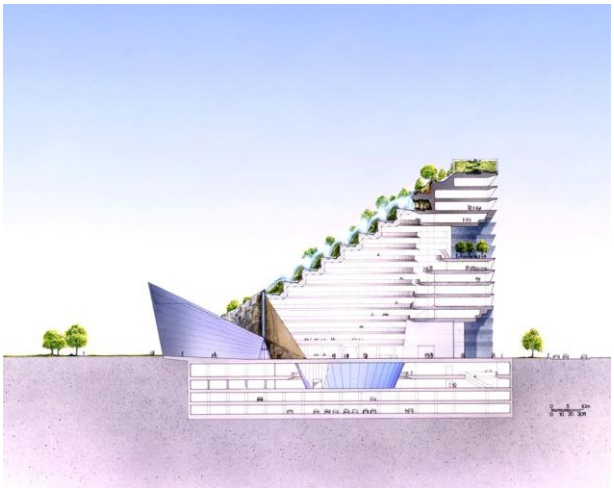
The building sits on 3.4 acres in the heart of downtown business district in Fukuoka, Japan. The site is sited right next to Tenjin Central Park along the river. Local citizens were concerned over the building turning into a large block. The community wanted the site to turn into an extension of the existing park right next to it. However, the city wanted to follow a strict development plan which called for a multifunctional facility.



http://www.greenroofs.com/projects/acros/acros7.jpg

The project was commissioned to Argentine architect Emilio Ambasz who successfully combined a public park with a mixed-use building. He extended the park building fifteen terraced landscape gardens. A person walking in the park could easily walk up the stairs of the building and not even notice they are on the building.

The building offers a 2,000-seat theater, international conference center, an event hall for 1,000 people, an international trade information center, an industrial exhibition center, and 430,000 SF of office and retail spaces. The building is 14 floors above ground and 4 floors below ground. The structure was built in 1994. The structure is steel framed with reinforced concrete.[49]



http://www.greenroofs.com/projects/acros/acros9.jpg

http://www.worldarchitecture.org/world-buildings/world-buildings-detail.asp?position=detail&country=Japan&no=338

[49] (Nakamura 1993)

Elephant and Castle Eco Towers London

The building was designed by Ken Yeang who works for T. R. Hamzah & Yeang International. The site is a district in South London. The area suffers from poor planning and poverty. The Eco tower was designed as part of a master plan to revitalize the area.

http://www.trhamzahyeang.com/project/skyscrapers/elephant-tower01.html

The building is a mixed-use building with an emphasis on residential units. There is over 1 million SF of retail and leisure, 3,500 homes, 500,000 SF of offices, and three parks. The tower is 35 stories with a total gross area of 95,765 SF.[50] The building is a microcosm of the city and contains these elements of a city block in a vertical structure. The building is Yeang's response to sprawl. The building has integrated uses and takes up little land, but still providing green spaces.

The building is oriented to maximize the solar heat gain during the winter. The building maximizes solar shading during the hot summer. Landscaping and vegetation on the building help absorb and reflect solar radiation and also helps create a cooler and pleasurable environment. All the floors are naturally ventilated and offer a naturally landscaped core.

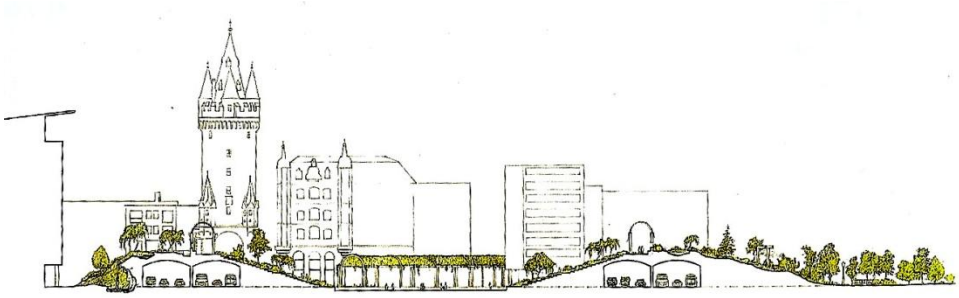
[50] (T. R. Hamzah Yeang Sdn. Bld. International n.d.)

Unfortunately the project was canceled; however as a design it looks like a great idea. Incorporating everything in a city block and making it vertical is a huge task.

http://www.trhamzahyeang.com/project/skyscrapers/elephant-tower01.html

Eschenheimer Tower

A competition was held by the City of Frankfurt to design a pedestrian street connecting the Eschenheimer Tower to a pedestrian area 1,000 feet away. The existing roads in the area are dangerous and many pedestrians avoid crossing.



(Bellini, et al. 1988, 171)

A vault that is covered with earth would provide traffic to pass underneath as well as pedestrians to walk over the hill safely. The hill would become a landscaped park and creating a strong connection instead of being a

barrier. The vaulted parks could be duplicated in multiple areas, which created a greenbelt around the city. The design won first place in the design competition.[51]

(Bellini, et al. 1988, 173)

(Bellini, et al. 1988, 169)

[51] (Bellini, et al. 1988, 168)

General Services Administration Renovation

http://www.nytimes.com/2010/01/31/us/31portland.html

The renovation project is an existing Edith Green-Wendell Wyatt Federal Building in Portland, Oregon. It was built in 1975 at 18 stories and constructed out of concrete and glass.

The most notable installation of the $133 million renovation project is the vertical fins. The fins are to be 200 feet high on the western façade. The vertical fins shade the western façade in the spring and summer and in the winter the plants go away and warm the building says Bob Peck, commissioner of public buildings for the G.S.A.[52] The architects of Cutler Anderson say captured rainwater from the roof and "greywater" from the interior plumbing can be possibilities to irrigate the green façade.

G.S.A. said that the building will use 60-65 percent less energy than comparable buildings and estimates a savings of $280,000 annually.[53] Solar panels, low-flow fixtures and energy efficient lighting will add to the energy savings.

The building was able to afford renovation work through the federal stimulus package that placed emphasis on sustainable projects. The building is the largest project in Oregon. However, some have opposed the project such as Senator John McCain and Tom Coburn who criticized the cost of the project

[52] (Yardley 2010)
[53] (Yardley 2010)

as one of the worst stimulus-financed projects. Their views are shortsighted since energy efficiency is something that will pay for itself throughout the lifespan of the building.

The renovation project is expected to be completed in 2013. SERA Architects are overseeing the project. Donald Eggleston, president of SERA Architects said landscaping experts are looking into which vines and cover plants will endure Portland's weather at varying heights.[54]

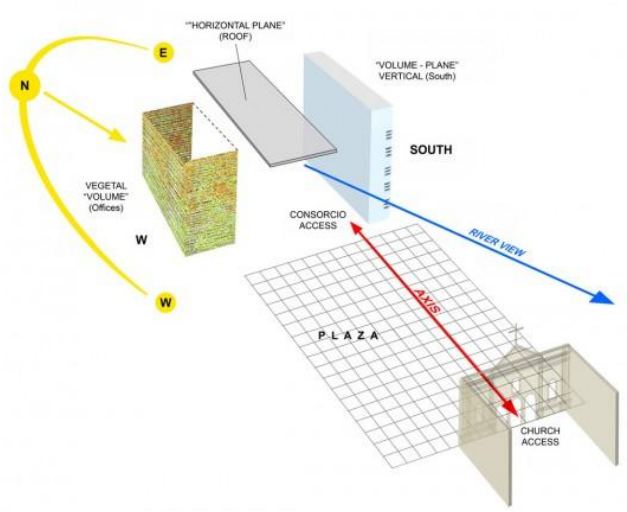
Consorcio Building in Concepción

http://www.archdaily.com/10685/consorcio-building-concepcion-enrique-browne/

The Consorcio Building is located in Concepción, Chile. The architecture firm responsible of the project is Browne Arquitectos. The building offers a green wall that was constructed by local wood, which serves to shield the office building from the sun and insulate the interior. The wood is laminated and supports the climbing plants.[55] The south face is clad in metal plates,

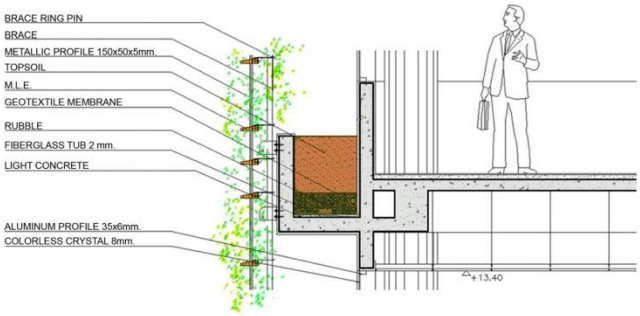
[54] (Yardley 2010)
[55] (Saieh 2009)

which is locally a well-known material in the area. The cantilever roof protects the upper floors from the Western sun.

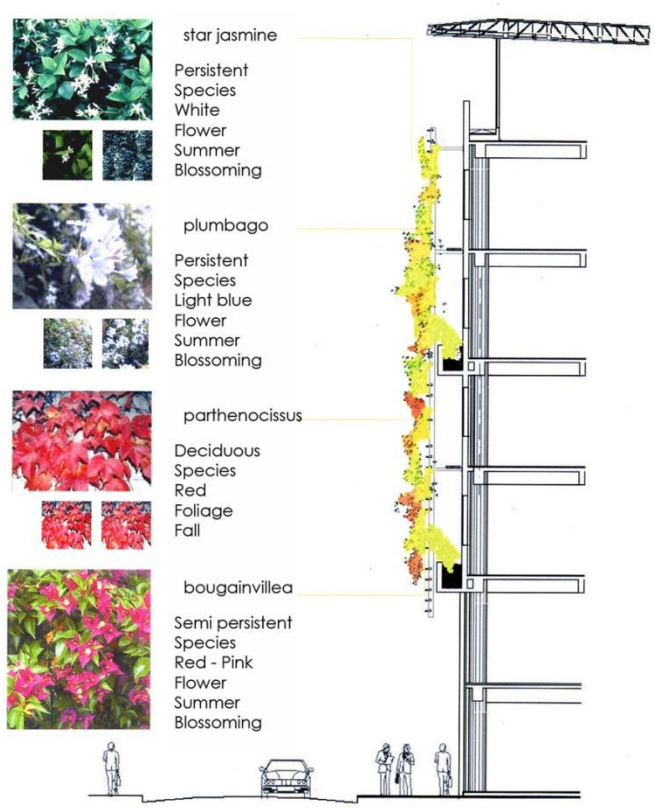


http://www.archdaily.com/10685/consorcio-building-concepcion-enrique-browne/

The picture above shows the three main elements of the building, which is the roof, south metal wall, and green wall. The green wall is attached to the concrete directly, but allows a gap so that the vines don't grow directly on the building.



http://www.archdaily.com/10685/consorcio-building-concepcion-enrique-browne/



http://www.archdaily.com/10685/consorcio-building-concepcion-enrique-browne/

A landscape architect figured out which plants could grow on the building façade and what kind of colors the building could blossom into. Instead of paint deciding the building color, the plants decided the color and texture.

The Consorcio Building in Santiago

http://2.bp.blogspot.com/_Ymx9e66vrGc/SYKUbE9tDUI/AAAAAAAAHf8/4nPj2gGT-Wc/s1600-h/DAS9f5yCxjbae5wwDAMggElOo1_500.jpg

The Consorcio Santiago Building is located in Santiago, Chile. The architects are Browne Arquitectos. The South sides of the buildings in Santiago suffer from serious heat problems during the summer. The green wall on the Western side of the office building provides a gap between the vegetation and the glass of the office building. The vegetation wall and curtain wall is called a double façade. The double façade allows for hot air to rise out and keep the building cool. The green wall also provides an interesting view for an office, which is a green forest instead of outside buildings.

http://2.bp.blogspot.com/_Ymx9e66vrGc/SYKZZlTRD-I/AAAAAAAAHg0/80m3XnKCG44/s1600-h/07_enrique-browne-architect_consorcio-santiago.jpg

Case Study Conclusion

All the case studies are examples of architects who consciously think of nature while they are designing. Incorporating nature on a building is not an easy thing to do and should never be poorly planned or else it will fail. The case studies will help me design my building, which will also have a strong connection with nature. The case studies allow me to build upon existing knowledge and create a successful building.

Site Analysis

Before I can design a building, I must understand the site by doing a site analysis. The site analysis is not only observing the things inside the property line, but looking at the surrounding community and how the site affects of the entire island. The analysis will ultimately help me design a better building that will enhance the community and the island of Oahu.

I gathered a few potential sites and began to narrow down the list until I had one. Many of the sites were in suburban areas and had almost no hope of ever being revitalized because it was in a bad location and other bigger malls were near it. The answer became clear once I knew I wanted to revitalize urban areas. The final choice was Nu'uanu Center.

Kaimuki Shopping Center

Niu Valley Shopping Center

Kapalama Village Center

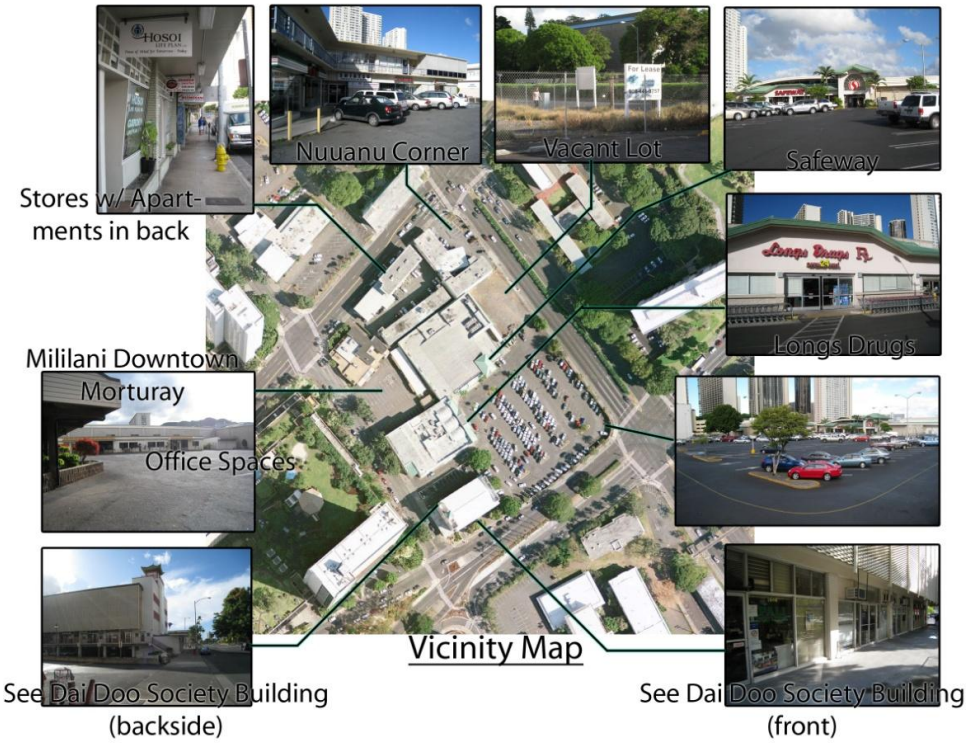
Nu'uanu Center

Source: Google Maps

The Site

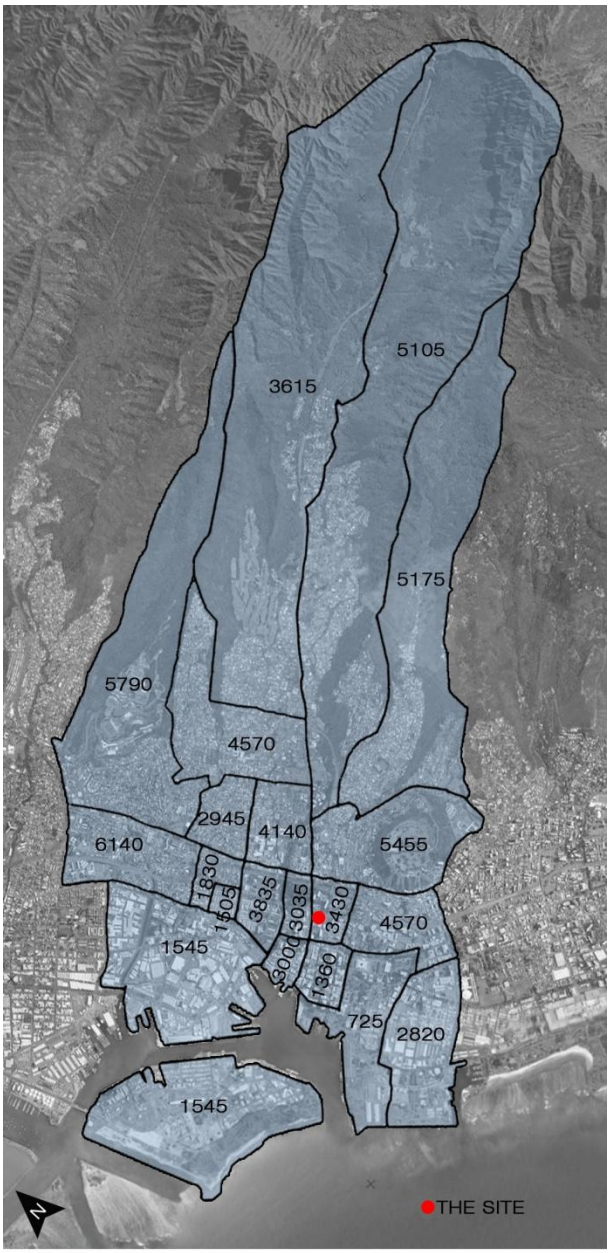
My research of the site involved many days walking around the area. I observed pedestrian movement, vehicular traffic, building uses, urban design, architecture, and location. Upon reviewing these sites I questioned myself about what I would want these areas to become. My intent is to produce a mixed-use community gathering area with strong integration with the community. The site in Nu'uanu was lacking in proper integration of uses and had poor pedestrian connections.

Nu'uanu is currently underutilized and is up for redevelopment. The entire block has a mix of offices, apartments, eateries, and retail. The site has a mix of uses, however they are not integrated and not planned to help each other. The area has a bunch of high-rise apartments, which means many people are living in the area; however most people wouldn't notice that it was a community. The schools and apartments in the area aren't enough activity for people to walk about and enjoy the area. Most people who pass by the area in their car think nothing of it.



Pictures taken by author

The design project is to look at the surrounding conditions and decide what other things could enhance the area and shape the area into a real community. The project is 70% urban design and 30% architectural design. Urban design affects a larger area and therefore I will be starting from a macro view of the city. The research and analysis will then zoom in closer to the site. Lastly, the site can be redesigned.

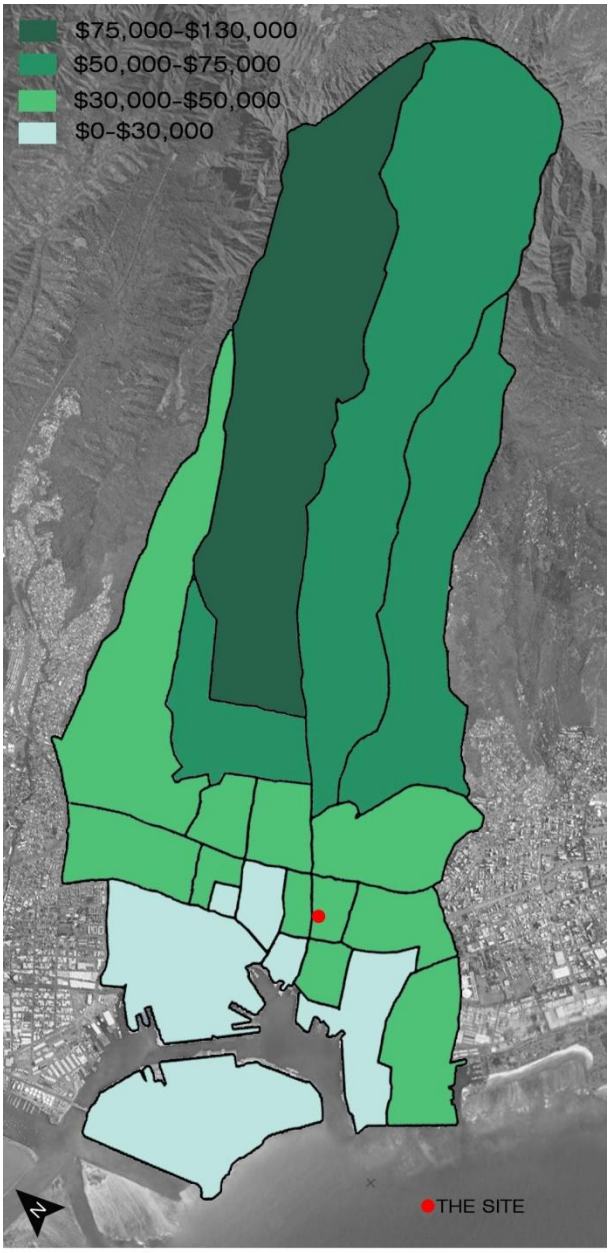


POPULATION BY CENSUS TRACTS
2000

US Census Bureau 2000

The picture above shows the population. The areas are divided by census tracts and evidence shows that around 6,000 people live in the immediate area alone. Also the areas near the site are small in size compared to the above tracts

on the mountain. The area has a relatively high density compared to other areas near the mountain side.



MEDIAN INCOME BY CENSUS TRACTS
2000

US Census Bureau 2000

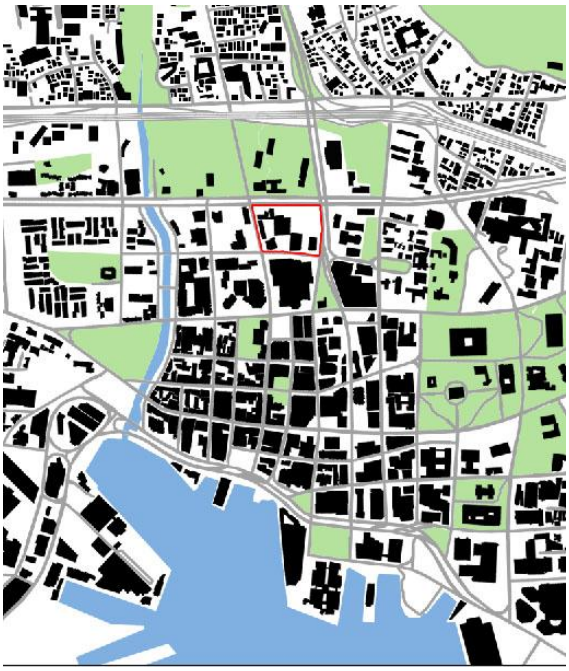
The picture above shows the median income levels. The downtown and Chinatown areas have limited high-rise apartments and condominiums, but the

majority of the buildings are businesses. The low income areas are Chinatown, industrial areas, and Kaka'ako.

The figure ground diagrams above reveal the densities and the spaces in between. The city is dense and compact and the areas toward to top of the picture are spaced apart and mostly suburban. The site is drawn in red.

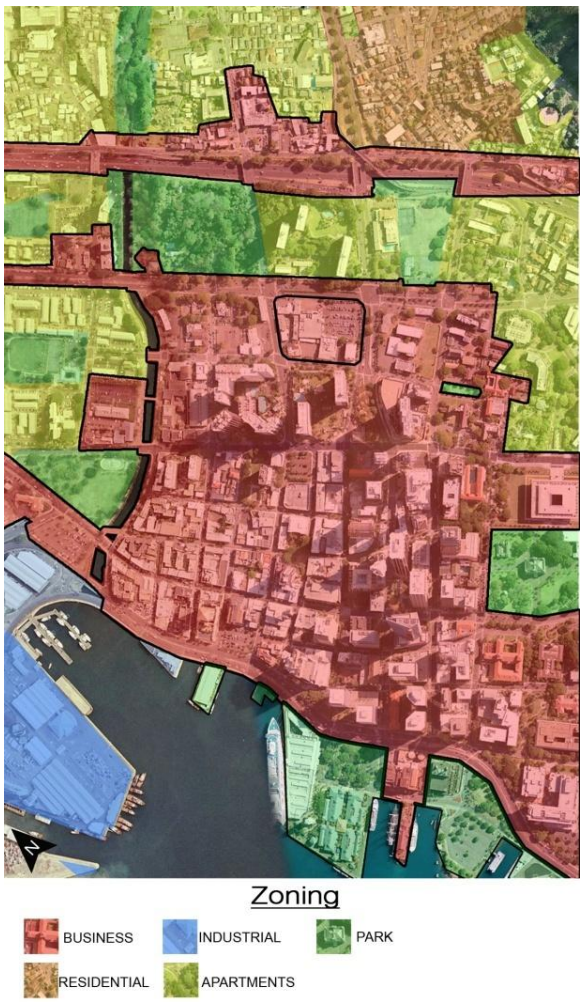
The city blocks are more compact and clearly show a grid pattern. The street network shows the main activities occur near the ocean because there are many street connections.

The yellow lines represent the high frequency roads with the road names attached. The roads are highly used and roads that every Oahu driver should know. The area is the heart of the city and gets really busy during rush hour. The two busiest streets are Nimitz highway and H-1 freeway which located in between the site.

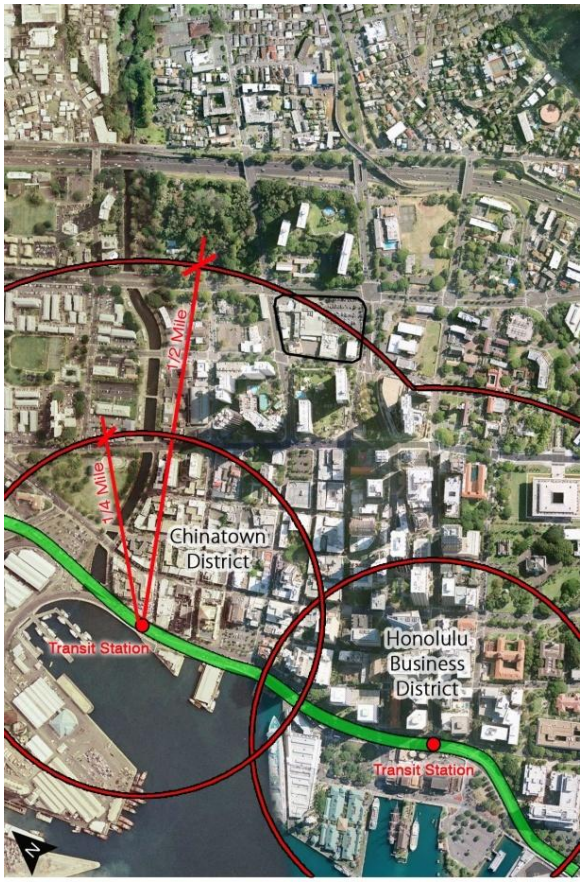


Above is a map of the buildings, green spaces, water, and road networks. The maps were looked at separately and finally I brought together all the images to see it as a whole.

Starting from the bottom of the picture, the diagram clearly shows the transition from urban to suburban. The suburban areas are not even blocks and have less connectivity. The small urban blocks promote walking. Downtown Honolulu, where the compact blocks are located, always has lots of pedestrian activity. Drivers assume to automatically slow down or at least be cautious when approaching crosswalks in the downtown area. The pedestrians have taken back the street and claimed it as their own.

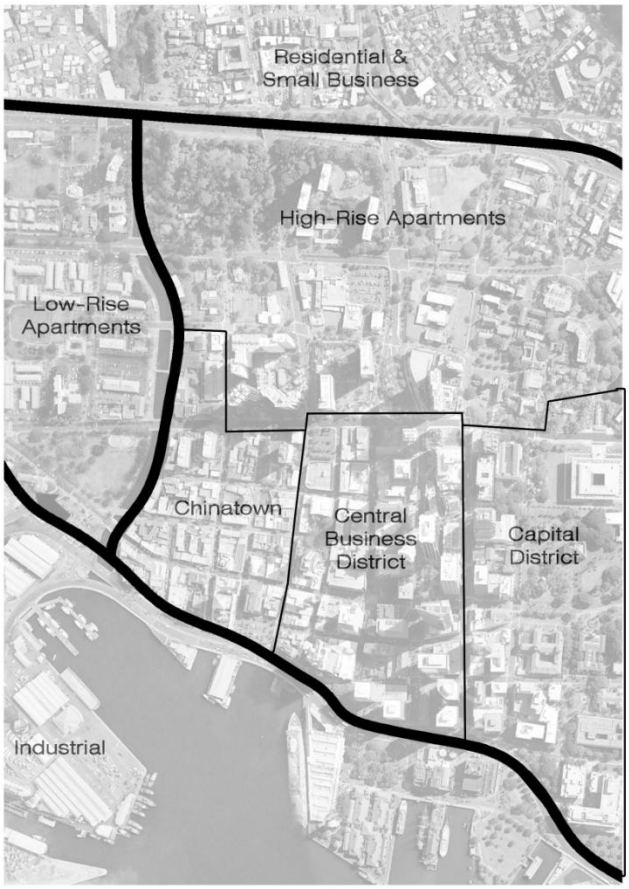


The current zoning map shows the uses of the area. The site is currently zoned BMX-4, which is business mixed-use. The surrounding area is a mix of residential and business. Low rise residential are found closer towards the mountains and high rise apartments and businesses are found towards the ocean.



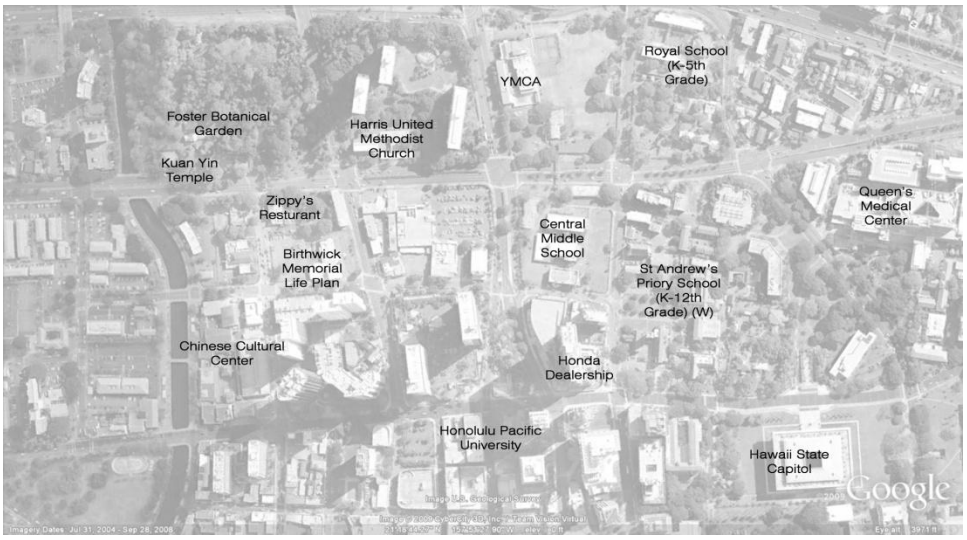
Transit Stations

The dot in red are proposed elevated light rail transit stops that will be built. The site is within walking distance to the station and would roughly take 12 to 15 minutes to walk to either the Honolulu Business District station or Chinatown station. Most likely scenario would be a pedestrian walking to the Honolulu Business District station because it is more direct path. Part of the design solution will be making this path of travel as comfortable as possible so people will be willing to walk half a mile. However, some might not want to walk that far so the bus should be able to accommodate these people.

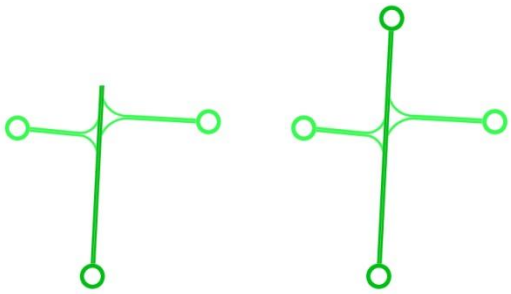


The thick black lines mark the edges of the different areas. Chinatown, CBD, and the Capital district have thinner lines, because they are not defined edges. The districts are connected well by car and foot. The transitions seem almost seamless.

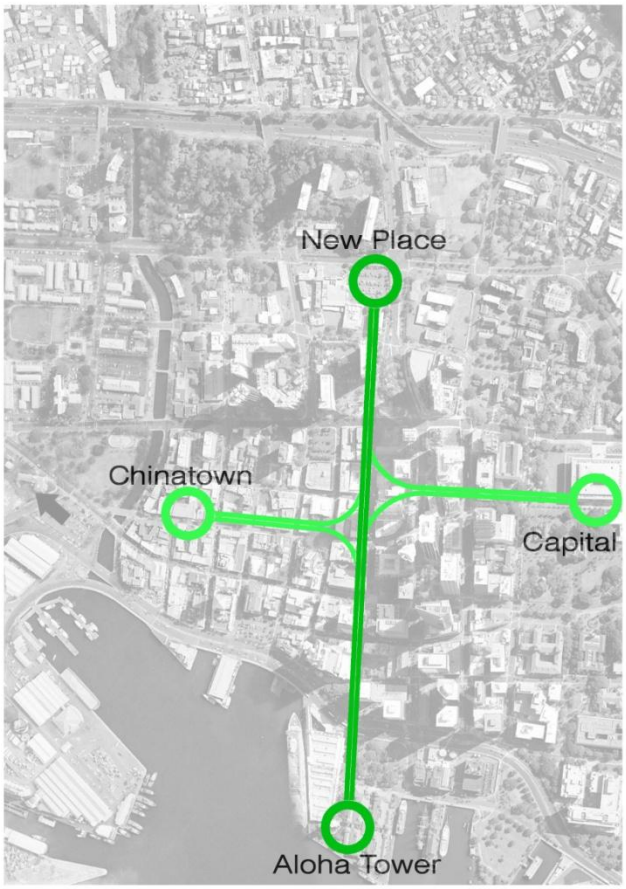
The site is above Chinatown, CBD, and the Capital District. There isn't much of an identity in the area surrounding the site. The area lacks any character and most people don't bother to think that people actually live in the area. The question I kept asking myself was what the site can be in order to form a sense of community.



The unknown area without an identity has plenty of things that make it a great place. There is a bunch of schools in the area which would cater to families. The school range from Kindergarten to 12th grade. The nearest public high school is McKinley High School which is roughly 1 ½ miles away. The Queen's Medical Center is within walking distance, just like Chinatown, CBD, and Capital District.



I walked up to the residential area across the freeway towards the mountains and all the way down to Aloha Tower by the ocean. I found there is a very strong existing connection between Chinatown, CBD, and the Capital district. The area of the site can potentially be another connection that can connect more people. The current connection forms a "T", but the connection should form a cross in the picture above.



The diagram above shows the axes of the area. The new place at the top is where the site is located. Something important has to happen at the site in order for it to serve as a node like the existing areas.

Aloha Tower/ Honolulu Harbor

Honolulu Harbor started when Captain William Brown sailed to the area in 1794. He was looking for an anchorage south of the Hawaiian Islands. The captain named it "Fair Haven." However native Hawaiians already had a name for the area and it was called "Ke Awa Kou." Honolulu was the name of a famous Hawaiian chief *Hono* meaning abundance and *Lulu* meaning peace or calm.

The harbor entrance was narrow and dangerous and it was impossible for a ship to dock without help from others. From 1794 to 1900 the procedure for existing ships docked in the harbor was to send their long boats and tow in arriving ships. In 1900 the harbor was dredged to 35 feet and widened to 600 feet.[56] The dredging made it possible to accommodate more ships with the increased demand.

The Aloha Tower was built in 1926. The tower was to give Honolulu Harbor a visual contact when ships approached the harbor. It was the tallest building from 1926 until the Second World War. The building is 184 feet tall.

Chinatown

Chinatown is filled with two to three story buildings made out of brick. During the day the place is filled with people along the streets. Chinatown is known for fresh fish, vegetables, restaurants, and recently for its bustling nightlife with clubs, bars, and art galleries. Efforts to beautify the town have taken affect as business owners revitalize it with activities and policemen patrol the area. Chinatown is busy during the weekend. The sidewalks can barely accommodate the foot traffic, but that compacts the pedestrians, which makes the area looks alive and safe.

Chinatown has lots of history. Chinese were the first Asian immigrants brought to Hawaii for labor work on the sugar plantations. Many soon earned enough money to start their own business. They settled in what is today known

[56] (Grantham 1998, 10)

as Chinatown. Chinatown has gone through two fires that burned down the entire district. The first fire happened in 1886 which burned 500 homes and destroyed almost everything in Chinatown. The second one was set by government officials in order to contain an outbreak of the bubonic plague. Chinatown was unsanitary and the board of health spent a lot of time and energy to clean up the district, monitoring restaurants, and observing building construction. Buildings in Chinatown were only allowed to be built from stone, brick, iron, or other fireproofing material. The threat of fire and unsanitary conditions are in the past and the area will not end up being burned down again.

Capitol & Iolani Palace

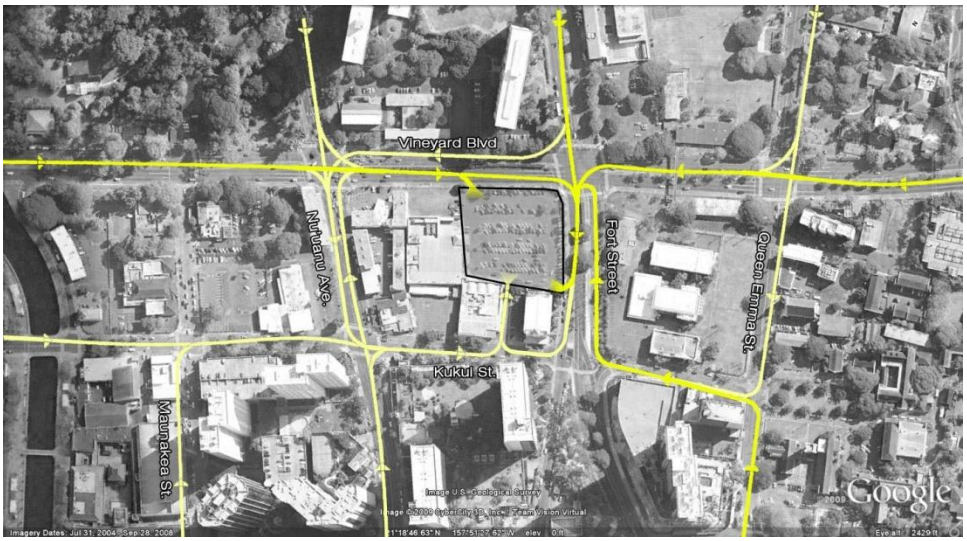
http://hawaii.gov/gov/office/statecapitol.html/

Hawaii State Capitol was built in 1969. Designed by Belt, Lemmon & Lo of Honolulu, Mr. John Warnecke of San Francisco, and Architects Hawaii. The building cost $24.6 million.[57] The State Capitol has a unique architectural style filled with symbolism. There are 8 columns in the front and back of the building to represent the 8 islands of Hawaii. The columns are shaped like palm trees. The capitol is surrounded by a reflecting pool that represents Hawaii being surrounded by water. The House and Senate chambers on the ground floor are shaped like a volcano that shaped the islands.

Below the capitol is the Iolani Palace. The palace was for King Kamehameha III, IV, V, and King Lunalio. Queen Lilioukalani was the last of the monarch until United States overthrew her and annexed Hawaii and turning it

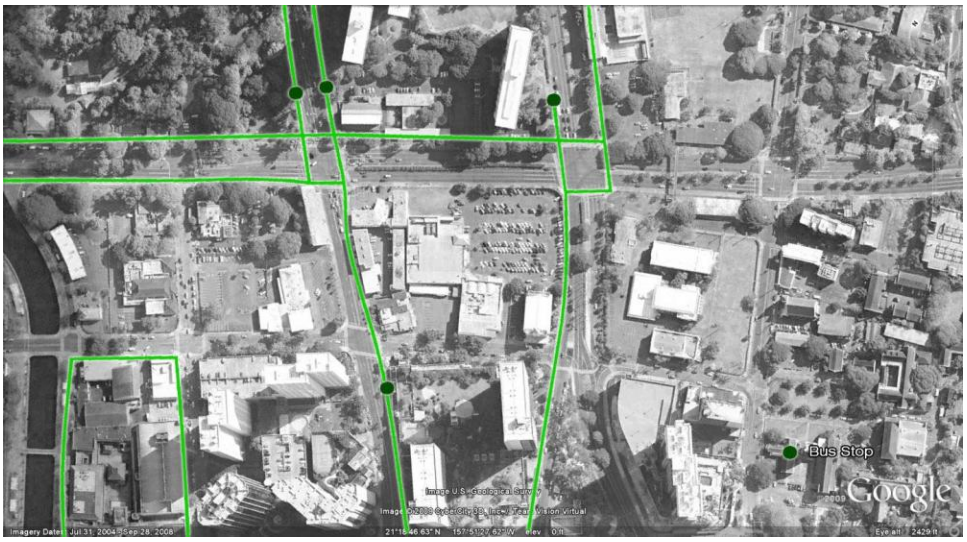
[57] (Office of the Governor 2009)

into a State. The building is the most important building and symbol of Native Hawaiians. The palace is regarded as sacred.



Vehicular Traffic

The dark yellow lines show the heavily used roads and the lighter colored roads are used less in the typical workday. The roads are heavily used during rush hour. Tons of people pour into the city during the morning and they leave the city in the late afternoon.



Pedestrian Paths

The green lines indicate the pedestrian traffic. The area has poor walking conditions compared to the busy downtown area. The dark green circles show the bus stop areas which create pedestrians because all transit modes start off and end on foot. Adequate public transportation is vital in bringing in pedestrians.

Site Analysis Conclusion

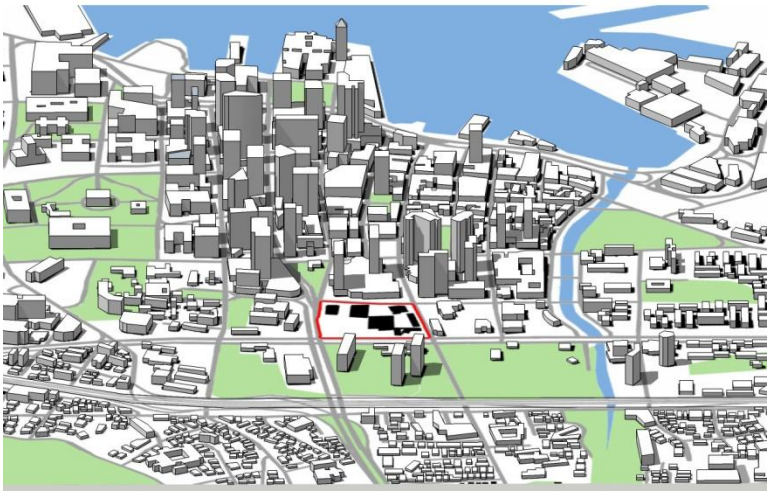
The site has lots of potential, but it needs a lot of work. The site needs to offer uses that the community needs. The community needs a stronger pedestrian atmosphere that allows for people to walk safely. Vehicle connections could also be improved.

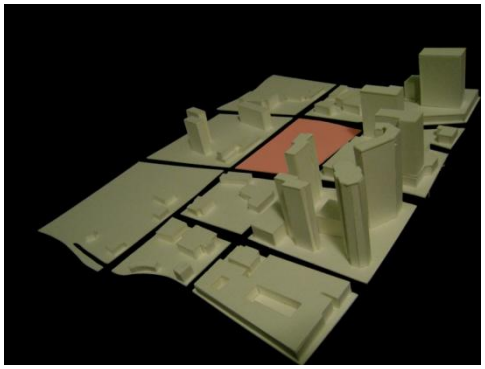
The next chapter is about the site and building design. The site will be improved to create stronger community connections and to help ensure the building's success. A successful building needs to offer things people want and be fully accessible to everyone.

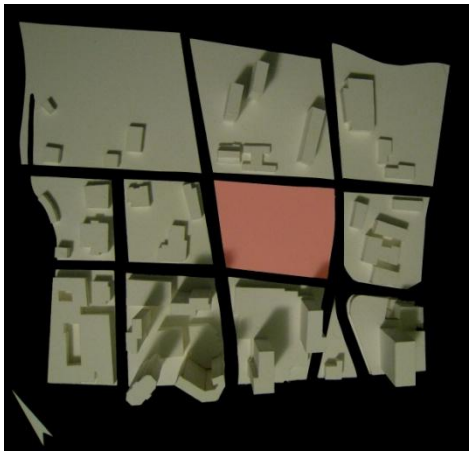
Design Project

Gathering Ideas

The project is deeply rooted in connecting the surrounding community. The surrounding area offers some parks and private green spaces; however I wanted to create a stronger connection between parks and major destinations in the area.







Computer 3D models were made of the surrounding area and a 1/64" scale model was made of the immediate area. These were created to help understand the site and help to spark design ideas.

Proposed Pedestrian Connections

The site analysis in the previous section showed certain things that could be improved. The major problem is the lack of pedestrian friendly areas. The site offers a horrible walking experience and made me feel uncomfortable. The picture above shows my desired plan for improving the areas marked with green trees. A stronger pedestrian connection will further enhance the look of the area and encourage more people to use it.

I discussed earlier about forming a connection to Fort Street Mall and this plan will help make that idea a reality. The area will also connect to Queen's

Hospital and make a safer walking experience across the H1 Freeway. Improving pedestrian connections will create more incentives to walk around.

Proposed Park Connection

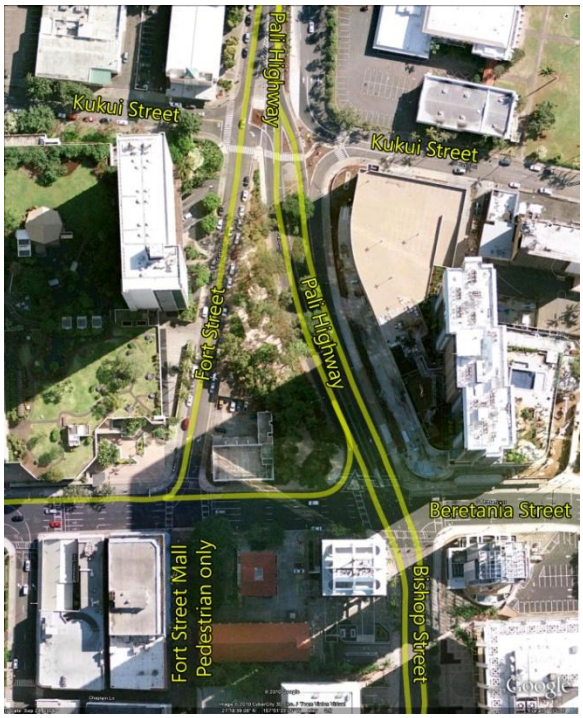
I proposed a green park connection. The existing Foster Botanical Garden and Lili'oukalani Botanical Garden are open to the public for a fee. These parks are not accessed as freely has a public park. The majority of the green spaces are for apartment dwellers only. The site will offer a public park to continue the open space connection. The park joined with mixed-use development will help form a place worth visiting and a place worth keeping in the community.

Fixing the Entrance to Downtown

The downtown entrance from the Pali Highway is problematic. Drivers coming from Kaneohe and the Vineyard off-ramp enter downtown through the Pali Highway and Fort Street. The roads are very confusing. Below is a picture of the entrance approaching downtown on the Pali Highway.

The driver has to immediately make snap decisions on which way he/she is heading towards. The road splits into three roads that either go straight or turn right. The multiple roads serve no purpose and only increase confusion. This area serves as one of the main entrances to downtown and must be designed to create a sense of arrival instead of panic.

Pedestrian safety is also extremely dangerous in this area. Walking across three roads without a traffic light is highly discouraging. People don't use the park in the middle of the Pali Highway and Fort Street because they would have to cross the road in order to get there. The park is isolated and serves no purpose.



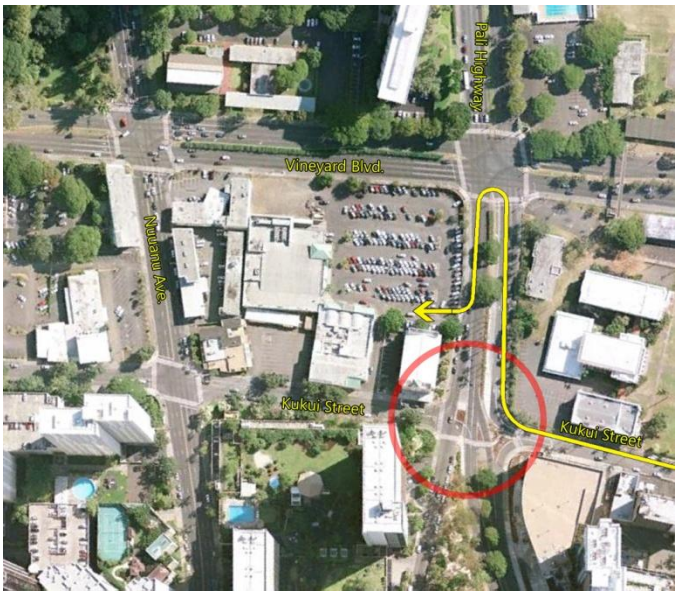
The existing condition is pictured on the top left. The morning traffic flows in from Kaneohe side via the Pali Highway and from the East side via H1 freeway off-ramp. Both Kaneohe and East side traffic enter through these roads. Many turn right onto Beretania Street and others go straight onto Bishop Street, which leads into downtown.

I propose all the roads be consolidated for less confusion. The Pali Highway will take part of the existing park away in order to accommodate more lanes. However, in return the new lanes will give up Fort Street to become a park. The park is now connected to the community and the pedestrian Fort

Street Mall is strengthened with more vegetation and safer walking conditions. The new unified route provides three right turn lanes and four lanes continuing into Bishop Street. The new route provides one more lane dedicated to right turns than the existing route.

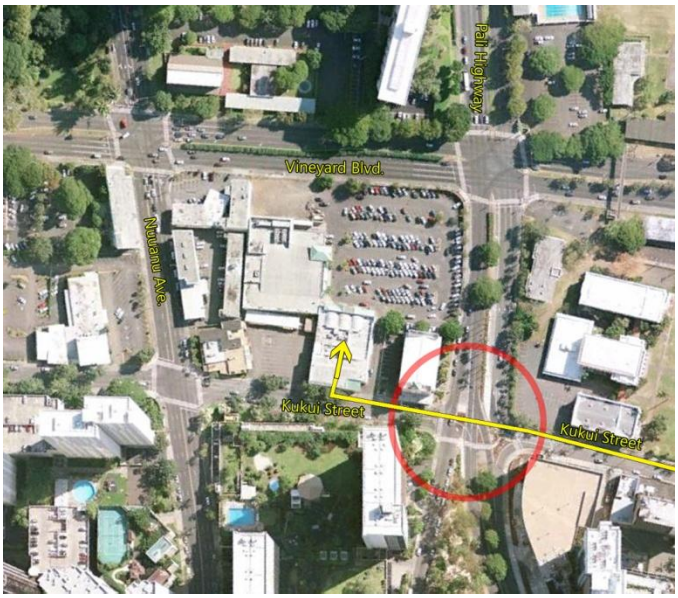
Access to the Site

The site access I very important since it is in a very busy area and has the potential to capture huge amounts of people with the right amount of uses and layout. The site is a square block. Cars have multiple access points because if they miss the turn into the parking structure they can simply turn around the site. However, there is one spot in particular that lacks adequate connection. Below is the



The only area that lacks proper connection to the site is the intersection at Kukui Street and Pali Highway. The only instance that a problem occurs is when cars access the site on Kukui Street from downtown. This usually happens in the afternoon rush hour, when a lot of people are heading home back onto the Pali Highway or H-1 on-ramp. The road is not connected and therefore cannot bring vehicles into the site directly. Motorist from downtown go on

Kukui Street and must drive up the Pali Highway and make a u-turn to access the site. The picture above shows the process of the very indirect way to travel, but it is what drivers do because they have no choice. The weird roads are confusing and only veteran drivers have the know-how to navigate to the site from Kukui Street.



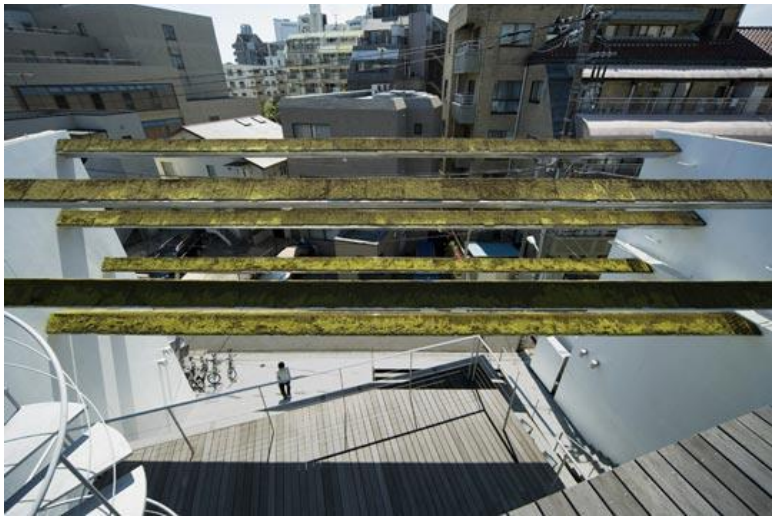
Connecting Kukui Street directly to the site will increase connectivity for the entire community and also create easier access to the site. The installation of traffic signals will ensure cars and pedestrians to cross the busy road safely. The alteration started off as a benefit for the site and also a benefit for the entire community.

Inspiring Ideas

Many ideas for the design came from case studies, reading books, and seeing pictures. I saw a picture online of 2007 AR (Architecture Review) Award for Emerging Architecture winner Taketo Shimohigoshi. The image took me by surprise because at first I thought it was grass superimposed on a picture of a city. However his concept design was moss growing on the tops of beams.

The image was pleasing to the eye and I wanted to incorporate his idea of vertical greenery. His concept was only applied about two stories above the

ground, but I wanted to have vertical greenery at much higher levels. Cities place trees on the street level to give a better walking experience to pedestrians, but how about the people looking out from the buildings? Once inside the building the view is often other buildings and very rarely do they get to see trees in their view, unless they are lucky. My vision is to give people in high rises a chance to see nature at elevated levels.



http://www.inhabitat.com/2007/12/13/ar-awards-taketo-shimohigoshis-elevated-vegetation/

Another inspiring idea was from a book called *The World Without Us* by Alan Weisman. The nonfiction book scientifically explored what would happen to Earth if humans were to vanish. Chapters explored city infrastructure and building materials. The interesting part about man-made structures is that nature will inevitably work its way into buildings and break materials down. This process will take years, and some materials will wear away faster than others. However, there is no escaping nature.

http://www.mondolithic.com

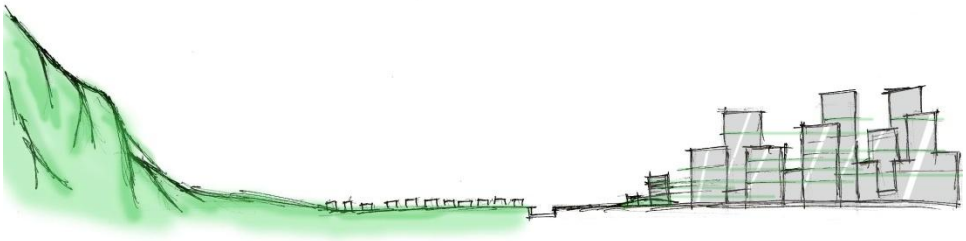
The idea of nature taking over a building was also seen in the movie *I am Legend* in 2007. A post apocalyptic New York City was abandoned for a few months and in the beginning of the film it showed grass and small shrubs taking over the streets and even deer roaming around the city. The movie shown audiences what New York City would look like without humans.

http://iamlegend.warnerbros.com/

I do not wish the extinction of humans, but I believe it is important to realize the incredible ability that nature has. The book and movie has changed my perceptions of our built environment. Our city has an image that it is unshakable and will always stand the test of time. However, it is exactly the opposite. Cities have evolved and will continue to change. Cities should

incorporate more of nature by planning and designing for plants to grow in the city in a controlled way, rather than nature taking it over by force.

Concept

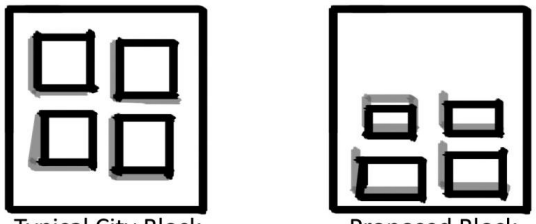


The design concept goal is to show the true power of nature and how it can wear away buildings and reclaim it. Nature has been mostly ignored in our urban environments and my design will promote its spread throughout the urban areas.

The Hawaiian Islands were formed by lava, but shaped and worn away by the wind and rain. Natural elements have smoothed mountains and created streams. The site is seen as a reflection of the wear and tear that has shaped the island of Oahu.

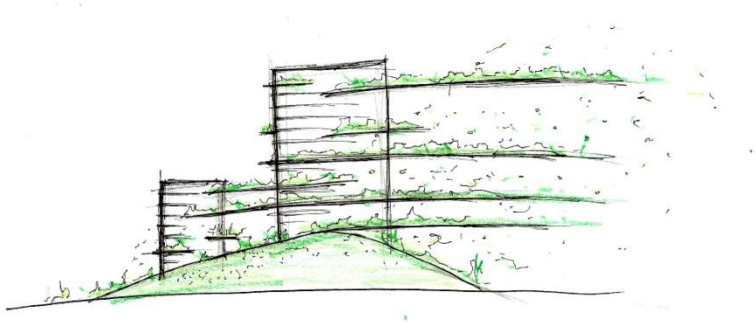
The landscape and buildings on the site are shaped by nature. Buildings are pushed back by the wind and the landscape is pushed by the winds coming from the Pali. The site is a huge block and I wanted to break up the block and turn it into a typical city block, which is divided into four parts. The city block would have roads vertical and horizontally dividing the site, but my site will show the divide by building form. The site will be divided by having each building in

one quadrant of the site. The buildings spatially imply the city block without supplying extra roads.

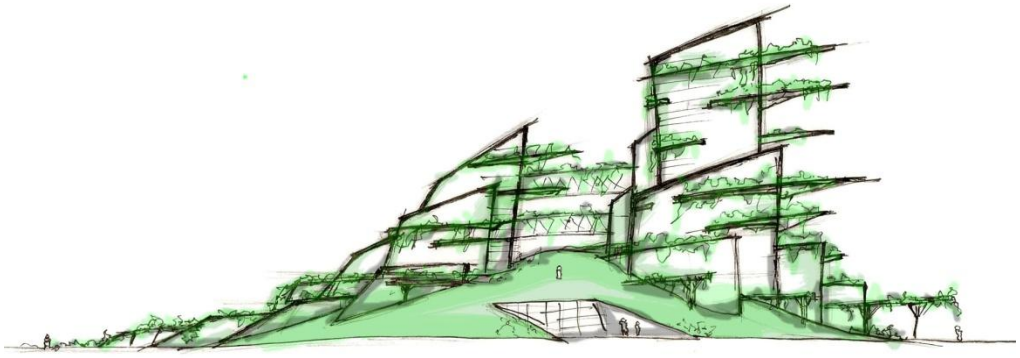


Typical City Block Proposed Block

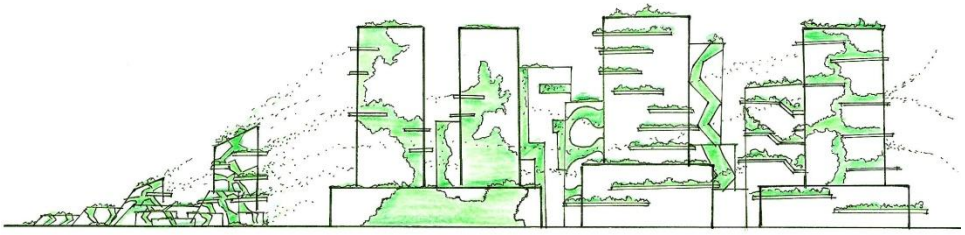
Originally my idea was to keep the site as a city block, with equal spaces on each side. However, the wind forces the layout to change. My proposed block concept is showing the building being affected by nature. The winds that come down from the Pali Highway helped push the buildings and landscape towards one end of the site.



Attached to the buildings are wind inspired arms that reach out towards the city. The green arms reach out to other buildings. The design will influence other existing buildings in the area to incorporate vertical parks and also incorporate green technologies to help curb energy consumption. The green contrasts with the concrete and glass construction.



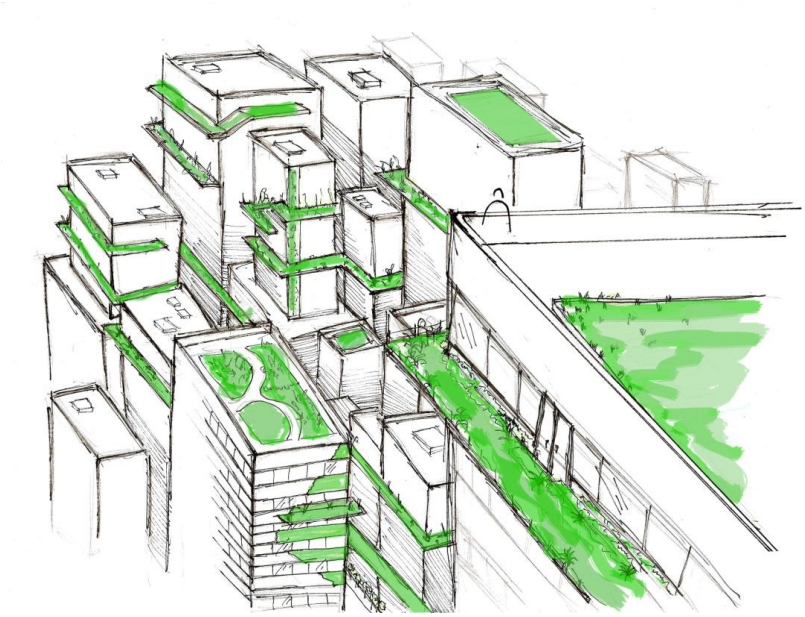
The shape of the building was formed by wind and helps to visually show the power of the wind blowing the seeds that will hopefully change the image of the city.



The wind blows seeds to the buildings and plants start to grow on them. This process is a conscious decision by building owners to incorporate planning and designing plants onto their building façade. The process and method is planned, but looks natural.

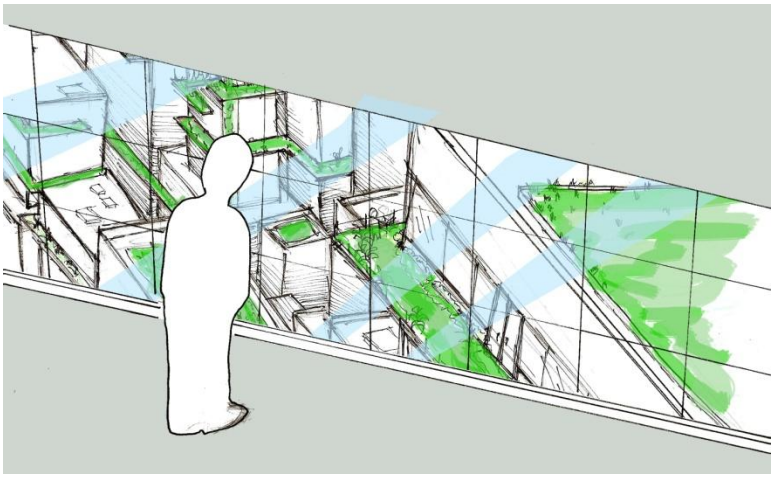
The vertical parks first start from the ground and “naturally” grow upward towards the sky, like vines. Nature seems to take over the existing buildings and it becomes infused with the structure.

Creating urban parks is a good thing, but is rarely accomplished since downtown area is prime land that would generate huge revenues if an office building occupied the land rather than wasting it on a park. The idea of vertical parks, vertical farming, and green facades can provide for the city without wasting prime development land. Instead these vertical parks are using the void spaces in between the buildings, which are not being used. The gaps in between the buildings are to allow air flow, light, and protect view corridors. Vertical parks will add to the views and clean the air, which will create a beautiful city from all angles.



The vertical parks are to be designed by the respective building owners and this design is only meant to be an example of what could happen. The idea

is to enable buildings to participate in the design. Businesses have reason to do this because they would be participating in greening the city, green business practices, and increasing productivity. Many old buildings in urban areas must be updated or even redeveloped to stay relevant. Businesses must remain competitive and as more and more businesses change to become sustainable environments, than others will surely follow.



The view from high office towers in downtown is usually of other buildings. The view is typically of glass, steel, and concrete buildings and seeing the tops of buildings, which reveal HVAC systems and plain roofing material. The views are sometimes impressive if a tower fronts the ocean, but most buildings see other buildings.

Plantings at the ground level are nothing new and have always served to beautify the street as well as provide an outside enclosure. Plantings at the ground level are rarely seen from around 15 or more stories up. The elevated green spaces provide ways to enhance the views at higher elevations. All the people at multiple levels have the opportunity to see, smell, and touch plant life right outside of their office window.

Sustainability Issues

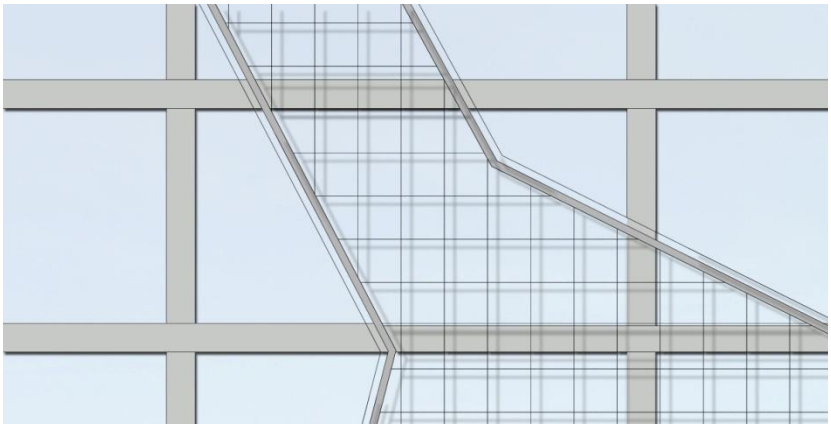
Visually, I wish to spread the color of green in the city and also promote sustainable design. The idea is to spread the idea of incorporating vertical planters as well as incorporating green technologies and other sustainable design solutions in existing and new buildings in urban areas. The project incorporates sustainable design solutions, such as green walls, natural ventilation, and rainwater retention.

The building is designed to spark an interest in sustainable design and inspire other buildings in the area to do rethink their way of doing things. The building I am designing isn't going to offer every single example of sustainable technology. The main intent is introducing nature into new and existing buildings on the outside and inside. Sustainable technologies and designs are implied with the installations of vertical planters and hopefully the other buildings will install green facades and use other sustainable practices.

Green Facade

Green facades are wall systems that allow for climbing plants to attach itself from the ground, intermediary structures, and from the roof. The planters at varying heights allow for vines to scale the entire height of the building. Green facades are separated from the building wall because plants can damage the building.

http://www.jakob.ch/801/
Jakob Rope Systems



The green facades can contribute to several LEED credits including:

Reduces urban heat islands (1 point)

Water efficient landscaping (1-2 points)

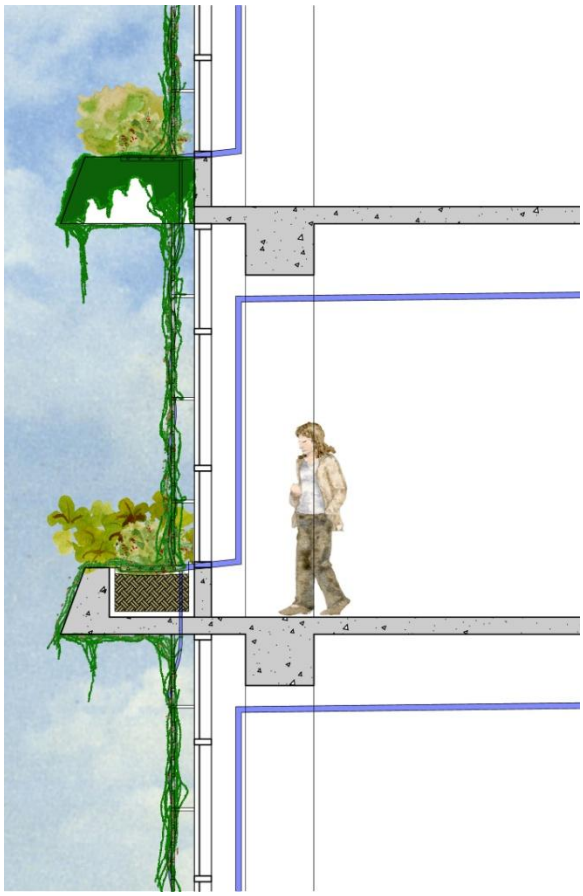
Innovative wastewater technologies (1 point)

Optimize energy performance (1 to 10 points)

Innovation in design (1-4 points)[58]

The green wall partially covers the building façade for all the buildings on the site. The planers and vines can collect the rainwater and help prevent rainwater runoff. The roof is terraced and serves to collect rainwater and help water the plants on dryer days. The vines and planters are watered by the rain collection tank on the roof. The water pipes serve the planters and other rubber tubes provide drops of water on the vines attached to the green wall.

[58] (Sharp, 2007)



Natural Ventilation

Natural ventilation for buildings is something unheard of in office buildings, especially in downtown. The idea is so simple, but it is rarely accomplished in high-rise structures. Typically buildings were designed to full capacity and were assumed that air conditioning would take care of the cooling. The high rise would ignore the wind and shut itself off from the World. However, people are becoming more energy conscious. Air conditioning uses up a lot of electricity. Businesses and architects are looking towards sustainable alternatives. The answer to our cooling problems isn't looking for alternative fuel sources, but looking to nature. High rise buildings offer plenty of wind, especially at higher levels.

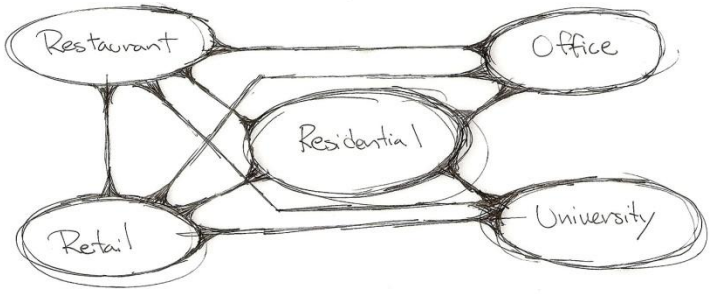
The city operates like a bunch of walls that block out the wind and force the wind to travel down street corridors. So what needs to be accomplished so

that every building can have wind is to make the city permeable. A forest is a good example of a permeable habitat. The majority of the wind can by directed and partially blocked by trees and shrubs, but it still allows for some breeze to penetrate the interior forest. The allowance of wind through the forest serves to help keep clean air flow and keep it cool. Buildings need to operate in the same manner. Buildings need to open up so it can ventilate buildings downwind of them.

The Uses

The project had to offer uses that were needed in the area and also uses that could complement each other. Strong links are formed by fulfilling the needs to the community and making sure the uses can help to support each other. The project was going to be roughly:

- 70 percent office
- 10 percent university
- 10 percent residential
- 5 percent retail
- 5 percent restaurant



Since the site expands the Fort Street Mall, I figured adding more Honolulu Pacific University classrooms would be helpful to expanding their campus. HPU has fragmented their campus because they have to rent spaces in

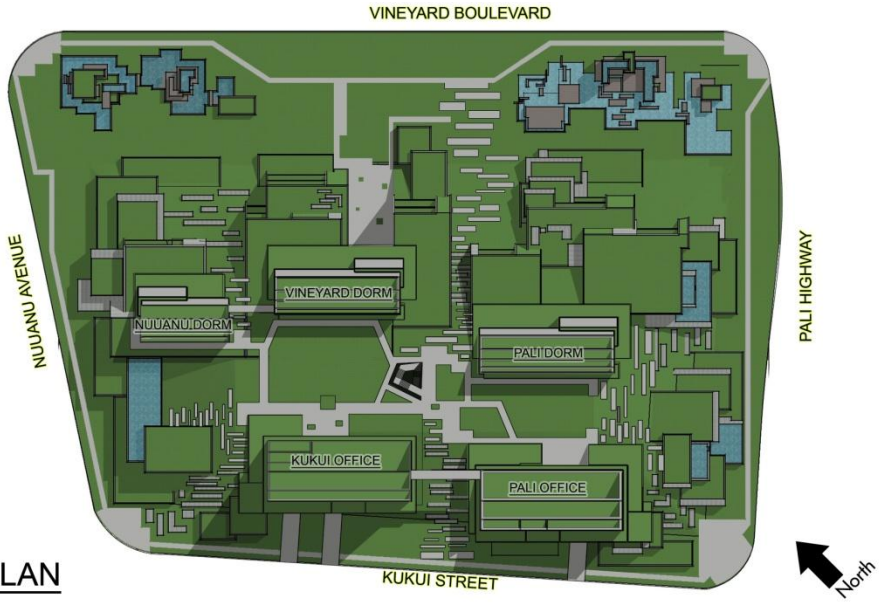
the city. The campus doesn't feel like a university since there is not clear area of where it starts and where it ends. The campus is spread out along the Fort Street Mall. Providing additional classrooms at the site will increase the campus axis that already exists.

Apartment spaces will also be provided. The apartments will offer students and others a chance to live closer to where they work or go to school. Living in such a nature oriented place will be a very desirable place to live.

The ground level will offer retail and additional HPU classrooms. The top floor of the office building will offer restaurant spaces to take advantage of the higher view.

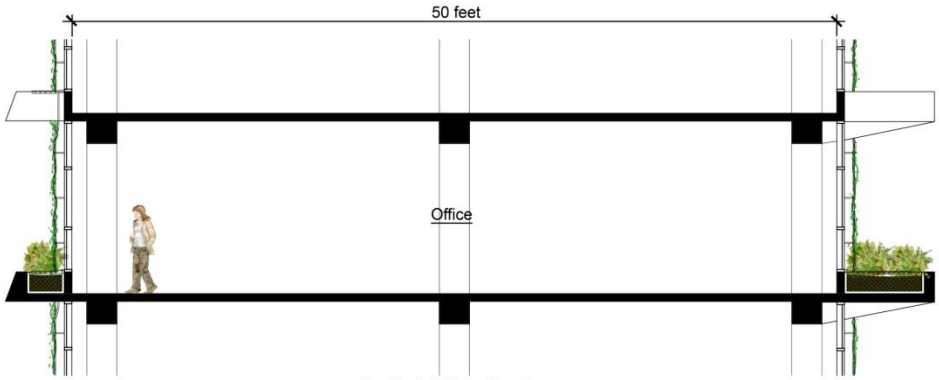
The overall site plan shows the site and the additional Fort Street pedestrian mall in context. The closure of Fort Street helps to accomplish the

green connection to the existing Fort Street. The new project will increase park space and reduce heat islanding.

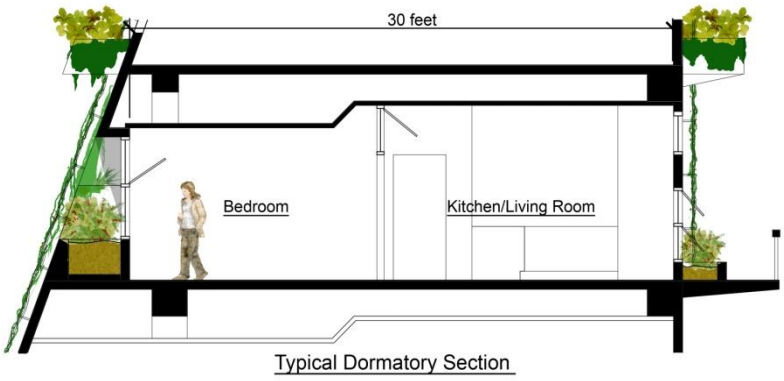


SITE PLAN

The two main uses are the office buildings and apartments. The pictures below show a typical floor section. The office and apartment buildings were sited perpendicular to the trade winds to take advantage of natural ventilation. The windows in both buildings are operable. Many windows are just meant to stay open. Hopper and awning windows in the residential apartments provide constant air flow and also keep out the rain.

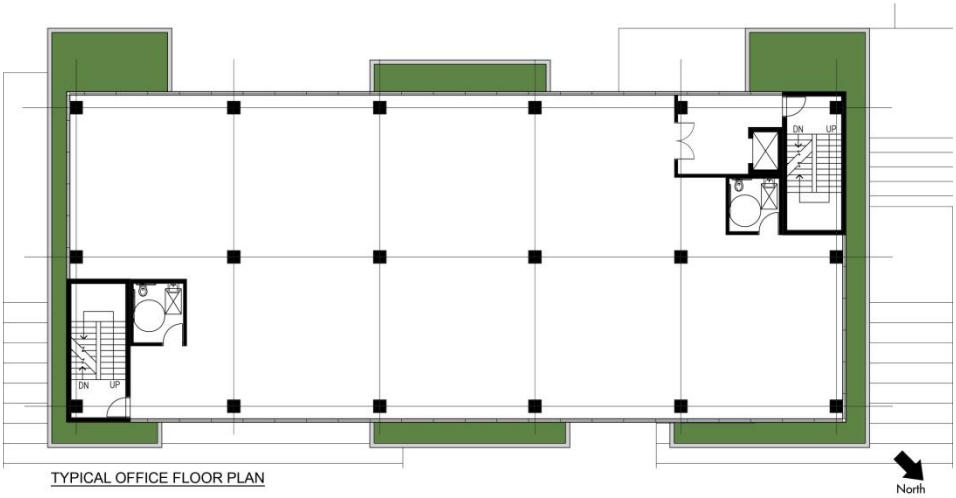


Typical Office Section



Typical Dormatory Section

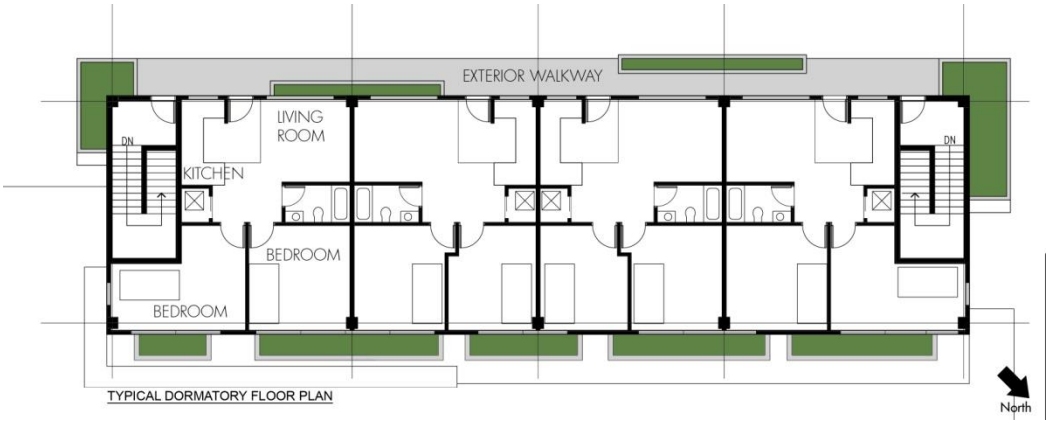
The floor plan for the office plan is basic. The rooms will be divided if more tenants want to take up the same floor and that will be up to the building owner to decide. The main thing that makes this different than most office buildings is the planters in the exterior. The tenants are able to plant what they wish given the limitation of a 12 inch soil depth. A 12 inch depth is more than enough for most plants. Typically a 12-18 inch soil depth is ideal for most plants. The landscape architect would recommend which plants are better suited for the exterior planters.



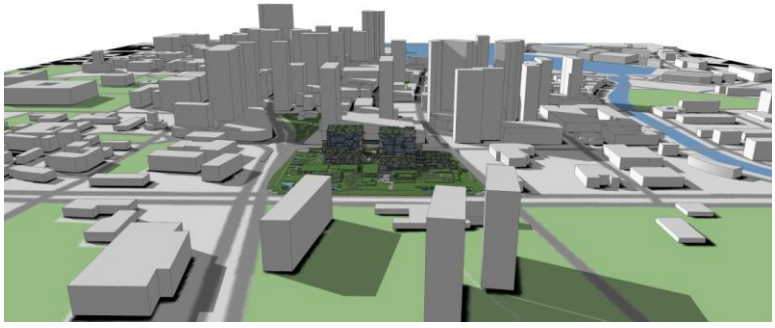
TYPICAL OFFICE FLOOR PLAN

The apartment buildings also have exterior planters and on the exterior walkway they have their own little yard for plants. The apartments don't offer balconies, because concrete balconies collect heat. The subtraction of the balconies gave more space to the interior rooms, which are more important.

The ground floor has a huge park space for all to enjoy so providing a balcony isn't important.



Overall View looking from Punchbowl



Overall View towards the ocean

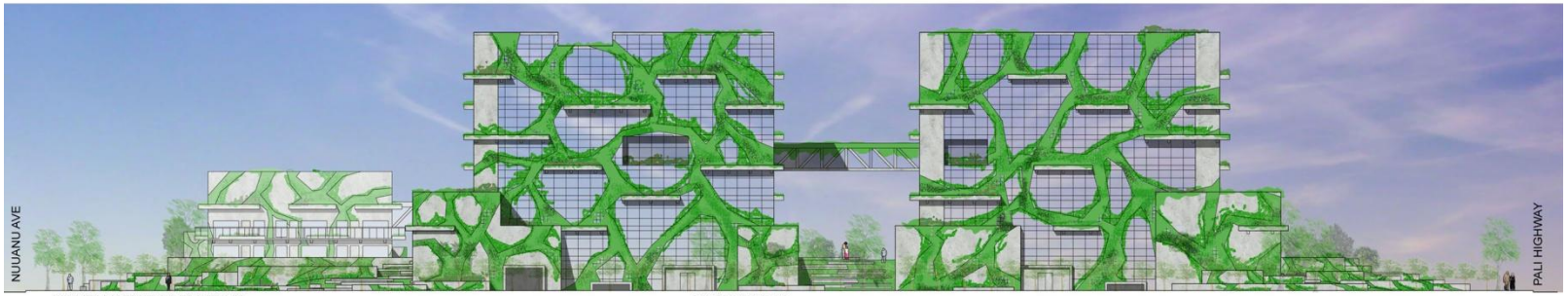

Section B
Iliahi St
Hialoa St.
N School St.
H1 Freeway
Vineyard Blvd.
N Kukui St.
Beretania St.
Puahi St.
Hotel St.
N King St.
Merchant St.
Queen St.
Nimitz Hwy
Section A
Lusitana St.
Punchbowl St.
Queen Emma St.
Pali Hwy
Nuuanu Ave
Maunakea St.
River St.
Aala St.

NORTH EAST ELEVATION

VINEYARD BLVD.

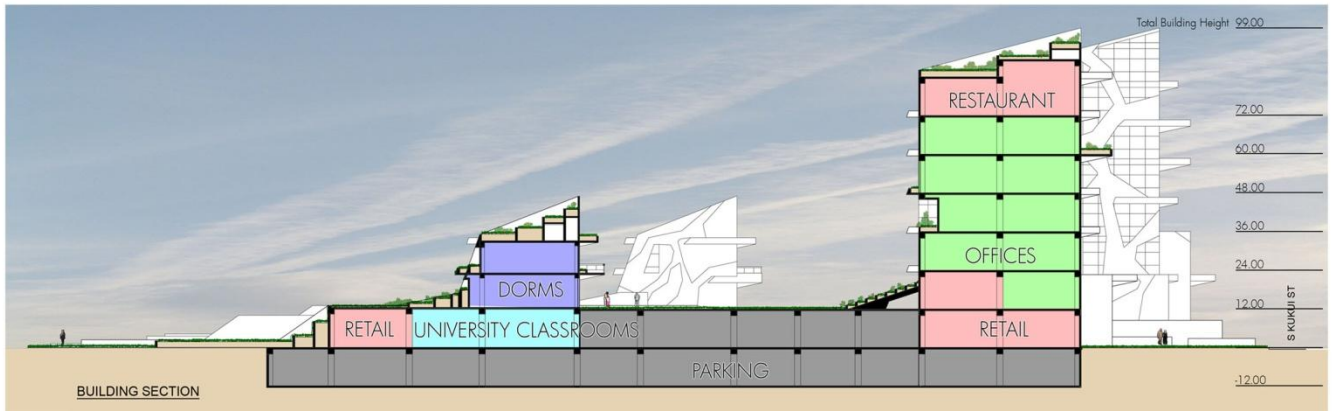
NORTH WEST ELEVATION (SOUTH EAST ELEVATION SIMILAR)

NUUANU AVE.



SOUTH WEST ELEVATION

KUKUI STREET



BUILDING SECTION

North West Corner

The North West Corner rendering shows lots of plants. The terraces help create levels and also hold in rainwater to prevent runoff. The park is a play ground and a public farming space. Bananas, papayas, lime trees, lemon trees, tomatoes, onions can grown in the park and terraces. Urban farming can provide food or a light snack to whoever wants it.

The issue of the park turning into a gathering place for homeless people shouldn't be an issue when uses like retail and HPU classrooms that keep a healthy mix of different people in the area at different times of the day, which creates a sense of safety.

North East Corner

The North East corner offers a little shallow pool areas and little concrete islands that people can hop on and explore. The pools are located along Vineyard Boulevard, which helps to cool the trade wind breezes that will first pass over the pools, cooling the air and then reach the apartments and offices. The pools also provide a sound barrier to help cancel out the car noises from the roads. The pools offer waterfalls and water fountains that people can play in on hot days and help cancel out the car sounds. The trees can't cancel out a significant amount of noise, but it can visually block the traffic and also clean the air. Both plants and water are used to transport the users of the park to a peaceful place.

The area also offers a stage area for concerts, plays, and other activities. The stage area is a simple elevated concrete slab that looks no different than the other areas, because I didn't want the stage to look like a formal stage. A formal stage with activity is great, but when it is not in use it looks empty.

Along Pali Highway

Along Pali Highway view shows the spaces between the buildings. The site offers a slight slope so concrete steps are found on the grass to assist people walking up.

Along Fort Street

The picture along Fort Street is the location where the road used to be, but was consolidated with the rest of the roads to the left of the picture. The extended Fort Street Mall offers covered walkways and more pools, sitting and playing areas. In the distance is the existing Fort Street Mall.

PALI AND VINEYARD INTERSECTION


VINEYARD STREET

Conclusion

Urban design is a powerful tool because it unities architecture, landscape, and city planning in effort to create a successful community. Urban design should be on every architects mind when planning and designing buildings and spaces. Hawaii's landscape is very important and we must protect it and celebrate its beauty. Using the right approaches we can create areas worth living in.

Through urban design, the issue of beautifying the city with nature caught my attention. Our urban environments are in need of change. We need to start incorporating nature in our cities in order to enhance our living and working experiences. Creating elevated planters and parks is my solution to greening dense urban areas, reducing heat islanding, reducing rainwater runoff, and influencing sustainable technologies with it.

The benefits of plants are vast and go well beyond aesthetic reasons. I believe building owners and businesses have enough reasons to retrofit their buildings with elevated green planters and green walls. A green trend is occurring in many businesses that incorporate green sustainable practices, which makes them more marketable. The idea of urban plantings and farming is another option for them to think about.

This research design project is a starting point for those who wish to continue to promote greening the city. Incorporating nature in our cities is just one aspect of sustainability, but it is an important one. I did this project in hopes that people would start to think about the importance of plants and the importance of proper urban planning to create livable spaces. I want our future urban spaces to evoke positive feelings, encourage walking and constant interaction. Our urban areas need to be revitalized and the best way is to go green.

Works Cited

American Society for Horticultural Science. *HortiScience.* May 16, 2008. http://www.ashs.org/pressrelease/index.php?option=com_content&view=article&id=958:greener-offices-make-happier-employees&Itemid=3 (accessed March 30, 2010).

American Society forHorticultural Science. *Hortscience.* 2008. http://hortsci.ashspublications.org/cgi/content/abstract/43/1/183 (accessed January 17, 2010).

Bellini, Mario, Alessandro Mendini, Michael Sorkin, and Ettore Sottsass. *Emilio Ambasz: The Poetics of the Pragmatic.* New York: Rizzoli International Publications, 1988.

Bogaerts, Megan. "Sprawl No More." *Innovative Home Magazone*, 2007: 76.

Cain, Nicholas L. *Sprawl Costs Us All.* 2000. http://www.sierraclub.org/sprawl/report00/intro.asp (accessed Janurary 3, 2010).

Calthorpe, Peter. *The Next American Metropolis: Ecology, Community, and the American Dream.* Princeton: Architectural Press, 1993.

Carr, Stephen. *Public Space.* New York: Cambridge University Press, 1992.

Chester E, (Rick) Chellman. *Traditional Neighborhood Development Street Design Guidelines.* United States, 1999.

Chiras, Dan, and Dave Wann. *Superbia! 31 Ways to Create Sustainable Neighborhoods.* Canada: New Society Publishers, 2003.

Coleman, Peter. *Shopping Envirnments: Evolution, Planning and Design.* Burlington: Elsevier Ltd., 2006.

Congress for the New Urbanism & The United States Envirnmental Protection Agency. *Malls into Mainstreets: An in-depth guide to transforming dead malls into communities.* 2005.

Congress for the New Urbanism. *CNU.* Feburary 2001. http://www.cnu.org/sites/files/Greyfield_Goldfields_vol2.pdf (accessed Feburary 9, 2009).

Coontz, Stephanie. *The Way We Never Were: American Families and the Nostalgia Trap.* New York: Basic Books, 1992.

Corporation, Real Estate Research. *The Costs of Sprawl.* Executive Summary, Washington, D.C.: U.S. Government Printing Office, 1974.

Duany, Andres, Elizabeth Plater-Zyberk, and Jeff Speck. *Suburban Nation: The Rise of Sprawl and the Decline of the American Dream.* New York: North Point Press, 2000.

Duany, Andres, Elizabeth Plater-Zyberk, and Robert Aluminna. *The New Civic Art: Elements of Town Planning.* New York: Rizzoli, 2003.

Dunham-Jones, Ellen, and June Williamson. *Retrofitting Suburbia.* New Jersey: John Wiley & Sons, 2009.

Engwicht, David. *Street Reclaiming: Creating Livable Streets and Vibrant Communities.* Canada: New Society Publisher, 1999.

Environmental Defense . July 2002. http://www.edf.org (accessed March 4, 2009).

Flint, Anthony. *This Land.* Maryland: The John Hopkins University Press, 2006.

Grantham, F. W. *Discover Downtown Honolulu.* Hawaii: Royal Design Publishers, 1998.

Harry, Seth. "A Short History of Suburban Retail." *Seth Harry and Associates, Inc. Archtiects and Retail Planning Consultants.* Feburary 8, 2004. http://www.walkablestreets.com/box.htm (accessed March 10, 2009).

Hughes, C.J. *Architectural Record.* May 29, 2008. http://archrecord.construction.com/news/daily/archives/080529bigbox.asp (accessed April 2, 2009).

Jacobs, Jane. *The DEath and Life of Great American Cities.* New York: Vintage Books, 1989.

Karp, Jonathan. "Suburbs a Mile too Far for Some." *The Wall Street Journal.* June 17, 2008.

Kato, Alison, interview by Reid Arakawa. (October 15, 2008).

Kavilanz, Parija. *CNN Money.* December 17, 2008. http://money.cnn.com/2008/12/17/news/economy/retail_wasteland/index.htm?cnn=yes&eref=edition_business. (accessed April 16, 2009).

Kellert, Stephen R., and Edward O. Wilson. *The Biophilia Hypothesis.* Washington, DC: Island Press, 1993.

Radiant City. Directed by Gary Burns and Jim Brown. Performed by James Howard Kunstler. 2006.

Lehrer, Jonah. *Boston.com.* January 2, 2009. http://www.boston.com/bostonglobe/ideas/articles/2009/01/04/how_the_city_hurts_your_brain/?page=3 (accessed April 1, 2010).

Lohr, I Virginia, and Caroline H Pearson-Mims. *Department of Horticulture and Landscape Architecture.* September 11, 2003. http://www.wsu.edu/~lohr/hih/air/ (accessed March 30, 2010).

Main Street National Trust for Historical Preservation. *Revitalizing Downtown: The Professional's Guide to the Main Street Approach.* USA, 2000.

Morris, Douglas. *It's a Sprawl World After All.* Canada: New Society Publishers, 2005.

Nakamura, Toshio, ed. "Fukuoka Prefectural International Hall." *A+U: Architecture and Urbanism* (Yohio Yoshida), April 1993: 150.

Norman, Jonathan, Heather L. MacLean, and Christopher A. Kennedy. *Comparing High and Low Residential Density:Life-Cycle Analysis of Energy Use and Greenhouse Gas Emissions.* Research, Toranto: ASCE, 2006.

Office of the Governor. *State Capitol.* 2009. http://hawaii.gov/gov/office/statecapitol.html/ (accessed October 18, 2009).

Plant-Care.com. *Landscaping Investment-Increase Property Value But How Much?* 2009. http://www.plant-care.com/landscaping-investment.html (accessed April 1, 2010).

Pottorff, Laura. *Plants "Clean" Air Inside Our Homes.* January 5, 2010. http://www.coopext.colostate.edu/4DMG/Plants/clean.htm (accessed March 30, 2010).

Putnam, Robert. *Bowling Alone: The Collapse and Revival of American Community.* NewYork: New Society Publishers, 2000.

Saieh, Nico. *Arch Daily.* January 10, 2009. http://www.archdaily.com/10685/consorcio-building-concepcion-enrique-browne/ (accessed April 1, 2010).

Serraino, Pierluigi. *Saarinen.* Taschen, 2006.

Sharp, Randy. *6 Thins you need to know about green walls.* July 1, 2007. http://www.bdcnetwork.com/article/379033-6_Things_You_Need_to_Know_About_Green_Walls.php (accessed April 1, 2010).

Shoup, Donald. "The High Cost of Free Parking." *American Planning Association*, 2005.

Simon Frasier University. *History.* November 27, 2007. http://www.sfu.ca/geog/geog351fall07/Group01/10_sur/centralcity.htm (accessed Feburary 2, 2009).

—. *Interactive Metro Vancouver.* November 27, 2007. http://www.sfu.ca/geog/geog351fall07/Group01/10_sur/centralcity.htm (accessed Feburary 2, 2009).

Strott, Elizabeth. *MSN Money.* 2009. http://articles.moneycentral.msn.com/Investing/StockInvestingTrading/is-the-american-mall-dying.aspx#pageTopAnchor (accessed April 16, 2009).

Sullivan, Malcom, and Dennis Adcock. *Retil Marketing.* Cengage Learning EMEA, 2002.

T. R. Hamzah Yeang Sdn. Bld. International. *T. R. Hamzah Yeang International.* http://www.trhamzahyeang.com/project/skyscrapers/elephant-tower01.html (accessed November 17, 2009).

Taub, Daniel. *Bloomberg.com.* Janurary 30, 2009. http://www.bloomberg.com/apps/news?pid=20601087&sid=aId.u_N9CC88 (accessed April 6, 2009).

The Center for Design Excellence. *Urban Design.* http://www.urbandesign.org/ (accessed December 7, 2009).

Todd, Drew. *Ohio Department of Natural Resources.* http://www.dnr.state.oh.us/forestry/urban/features/propertyvalue/tabid/5459/Default.aspx (accessed March 30, 2010).

Transportation Riders United, Inc. *Understanding TOD.* 2006. http://www.detroittransit.org/cms.php?pageid=44 (accessed September 16, 2008).

Valley, Matt. *National Real Estate Investor.* May 1, 2002. http://nreionline.com/ar/real_estate_remalling_america. (accessed Feburary 9, 2009).

Warson, Albert. *Working on Top of the Store.* 2009. http://retailtrafficmag.com/mag/retail_working_top_store/. (accessed March 4, 2009).

Weingroff, Ricahrd F. *A Day in History.* June 29, 1956. http://www.fhwa.dot.gov/interstate/thisday.htm (accessed September 1, 2009).

Witherspoon, Robert E., Jon P. Abbett, and Robert M. Gladstone. *Mixed-Use Developments: New Ways of Land Use.* Washington DC: Urban Land Institute, 1976.

Yardley, William. *The New York Times.* January 30, 2010. http://www.nytimes.com/2010/01/31/us/31portland.html (accessed April 1, 2010).

Yates, Diana. *News Bureau Illinois.* Feburary 13, 2009. http://news.illinois.edu/news/09/0213nature.html (accessed May 30, 2010).